NOVEMBER
1960
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35¢

AMERICAN Cinematographer

The Magazine of Motion Picture Photography

SPECIAL IN THIS ISSUE

- Special Effects Without Mattes
- Instrumentation For Shipboard Missile Tests
- Lighting Equipment For Industrial Film Production

Dave Ellison (left) and Paul Sutherland encourage their star guinea pig on the set for "Tales of the Riverbank." Watching are Josef Seckeresh (at the camera) and Ron Ringler, Du Pont Technical Representative.

"WE GET 35 mm QUALITY WITH 16 mm DU PONT 'SUPERIOR' 2"

Josef Seckeresh, C.S.C., Director of Photography for Riverbank Productions, reports that Du Pont "Superior" 2 has a tonal range far greater than any other film they have used; "it is the first 16 mm negative film I'm at home with."

David Ellison and Paul Sutherland, owners of Riverbank Productions, Ltd., Toronto, warmly second their cameraman's opinion. Their "Tales of the Riverbank" series, featuring live animal actors in whimsical situations, has been widely shown in Europe and Canada, on TV and in theaters. This series recently received an award of merit from the Canadian Film Awards.

"We must have a film we can count on," says Dave Ellison, "since we can't often reshoot a scene. Using animals, you get what you want only once. With 'Superior' 2, we can be sure we *have* it."

"And the service we get from the Du Pont Technical Representative is as fine as the film," adds Paul Sutherland. "How can you do better than that?"

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AMERICAN

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ON THE COVER

WHILE CINEMATOGRAPHER William Clothier's crew readies lights and camera, John Wayne, making his debut as film director, gives last minute instructions to Linda Cristal and Joseph Calleia for scene for "The Alamo," $12,000,000 production of the historical 13-day battle for Texas liberty. Story about the photography appears in this issue.

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AMERICAN SOCIETY OF CINEMATOGRAPHERS

FOUNDED January 8, 1919, the ASC was established to advance the art and the science of cinematography; to encourage, foster, and strive for preeminence, excellence, artistic perfection and scientific knowledge in all matters pertaining to cinematography; to bring into closest confederation those leaders in the cinematographic science whose achievements in that field entitle them to membership in the Society; and to promote the interests of all who shall be called to membership in the ASC, that such membership may become a mark of honor and distinction based on merit.

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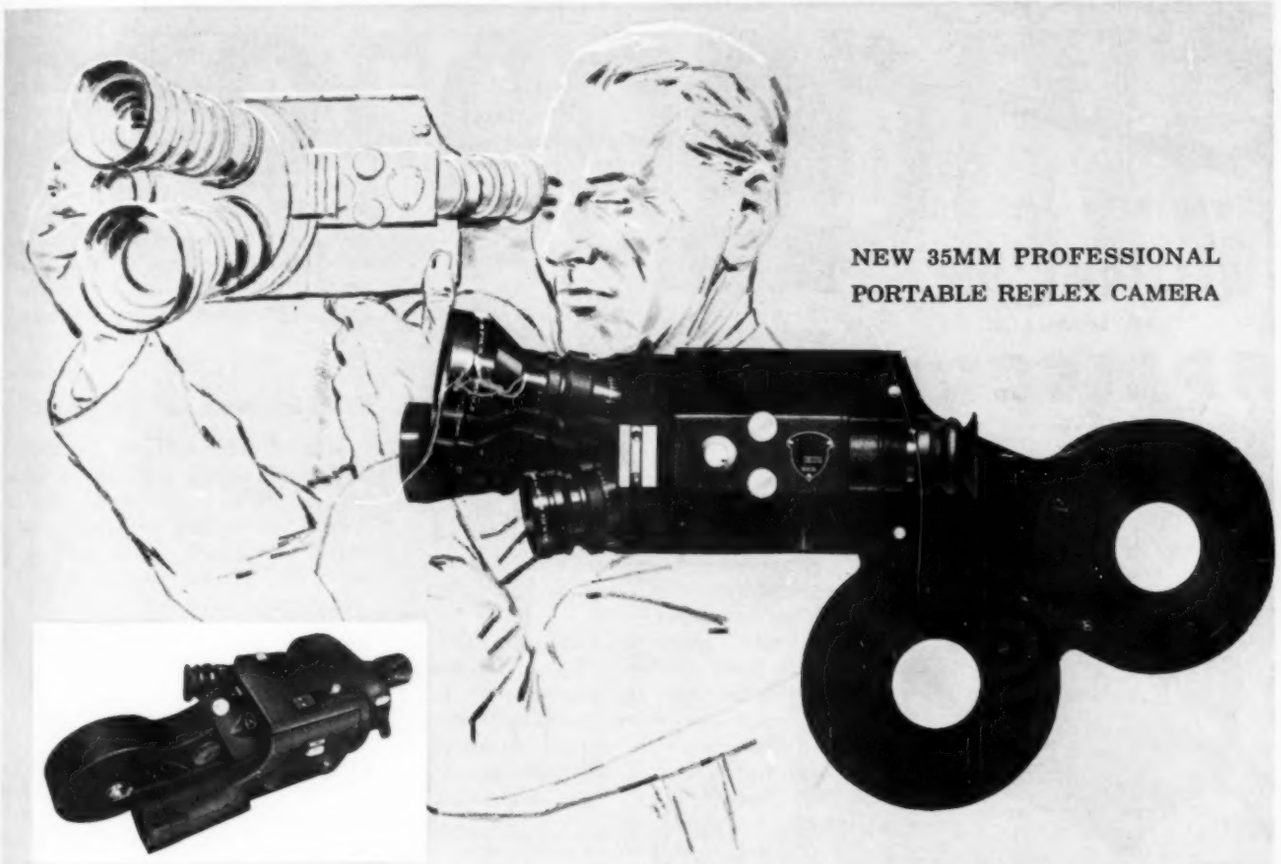

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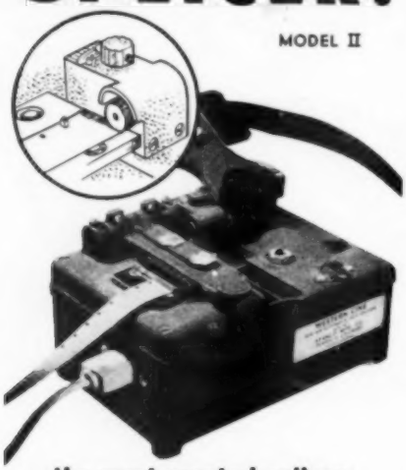

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INDUSTRY NEWS

News briefs of industry activities, products and progress

SMPTE Honors Ub Iwerks

Ub Iwerks, Director of Technical Research at the Walt Disney Studio, Burbank, Calif.,was presented with the Society's Herbert T. Kalmus Gold Medal Award at a dinner October 18th at the Sheraton Palace in Washington, D.C., following opening of the SMPTE-sponsored 5th International Congress on High-speed Photography.

UB IWERKS
Veteran Disney technical engineer honored by SMPTE with Herbert T. Kalmus Gold Medal Award.

Iwerks has been an outstanding technical innovator in the motion picture industry since 1925. He was first associated with Walt Disney in Kansas City in 1920, during the pioneering days of the animated cartoon. He rejoined Disney later in Hollywood working as an artist and cartoonist and was chief animator of the early "Mickey Mouse" cartoons.

Iwerks pioneered in developing methods of combining live-action and cartoon in color. He is responsible for the color correction masking system and color separation negative technique used in 16mm-to-35mm blow-ups for the Disney "True Life Adventure" series.

Earlier this year, Iwerks, who is also a member of the American Society of Cinematographers, was honored by the Academy of Motion Picture Arts and Sciences with an award for the design of an improved optical printer for special effects and matte shots in color.

* * *

14 Cameras Start "Hatari"

With 14 cameras simultaneously photographing a charging elephant herd, production began in Arusha, Africa, October 11 on Howard Hawks' "Hatari!" for Paramount.

Fourteen Mitchell cameras — 12 of them remotely controlled—recorded the unique opening under the supervision of Director of Photography Russell Harlan, ASC.

Strenge Cited For TV Photography

For his camera work on two TV commercials: "Cutout," for Union Oil Co., and "The Family Car," for Renault Dauphine, Walter Strenge, ASC, last month was presented with Award Certificates by the First American TV Commercials Festival, held latter part of September in New York City.

One of the primary purposes of the Festival is to focus recognition upon the individual creative talents who are responsible for the outstanding work being done. Ad agencies and production companies entered the films, which were then judged by a panel of 50 leading advertising executives. Awards were also presented to the producers, writers, and others involved in the creation of the cited TV commercials.

* * *

MGM Sponsors College Award

Metro-Goldwyn-Mayer studio will offer a six-month contract to the winner of this year's Gold Medallion Award presented annually by the Screen Producers Guild for the best experimental film produced by U. S. colleges and universities.

* * *

Anniversary

Edward O. Blackburn, Vice-president and General Manager of W. J. German, Inc. of California, last month celebrated his 35th year as head of California distribution for Eastman professional motion picture films. In 1926, Blackburn joined J. E. Brulator, Inc., of California, which subsequently was acquired by W. J. German, Inc.

* * *

100-G Industrial Film

MGM-TV's industrial film division will produce a major industrial film budgeted in excess of $100,000 for Johnson's Wax Co. Commitment is said to be one of the largest ever tendered any of the major studios, the majority of which now have set-ups for producing top quality industrial films, using the vast facilities of their respective studios. Sponsor will use the film on television and as a visual aid in various organizational showings.

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CUNNINGHAM, portable; pilot pins; 110V motor; 200′ mag.; case $295.00
WALL MOVIETONE; 4 lenses; 2-400′ mags.; 12V motor; Mitchell type finder; dovetail base $895.00
DEBRIE K, metal, 3 lenses; 12V motor; 6-400′ mags; mattebox; cases $395.00

★ CAMERAS, 16MM

CINE Special I w/Pan Cinor 60 lens.....$295.00
AURICON PRO 200. Less sound.....$495.00
B&H SPECIALIST w/rackover; 400′ magazine, syncmotor; footage counter; telescopic finder; cases. $1800 value $595.00
BOLEX, Converted 400′ mag.; rackover; telescopic finder; 110V wild motor. $900 value.....$449.50
B&H 70DA w/400′ mag.; 3 Cooke lenses, case $495.00
MAURER 05 w/finder; 400′ mag.; syncmotor; mattebox, case. $5600 value $1995.00
MAURER 05, 4-lens turret; vertically mounted syncmotor; turret and focus controlled from rear like TV. Less lens, mag. and finder $995.00
CINE Special I; 3 lenses; zoomfinder; case $347.50

★ CAMERA ACCESSORIES

MITCHELL Aerial Vertical viewfinder 5x7 groundglass; 10″ f/4.5 B&L lens. Worth more in parts....$19.95
CINEFLEX 35mm 200′ magazines. (Convertible to Arriflex) $6.95
PHOTO RESEARCH Spectra Meters with filters sphere, case. 2 Color $129.50
NATIONAL CINE Crab Dolly, very good, $1000 off $3750.00
MOTORIZED DOLLY w/revolving head; 7′ boom height; 2 seats; hihat; brackets for 6 lites. Cost $4000..$795.00
MH Viewfinder, B&H mount. $160 value $99.50
DURALUMINUM BLIMP, sponge-lined for 1200′ Maurer or other cameras with vertical motor.....$69.50
HI-HAT for Jr. Tripods. New.....$15.95
CECO CINE Special Blimp, syncmotor $395.00

★ LABORATORY EQUIPMENT

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CINECOLOR Double Head 35mm Step Printer with automatic lite change and timing device. Originally $12,000 .....$2495.00

★ LIGHTING EQUIPMENT

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BARDWELL-McALLISTER 2000W Spots, likenu $89.95
MOLE RICHARDSON 2000W Spots, black #412.....$79.95
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ACMIOLA 35mm Viewers w/stands, 6″x8½″ picture, motorized. $1500 value $295.00
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ACMIOLA Preview 35mm composite sound/picture (6″x 8½″) w/separate sound & counter; $3000 val.....$495.00

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NEW BOOK REPORTS

Animation Art In The Commercial Film, *by Eli L. Levitan. Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y. $6.95.*

Eli L. Levitan is one of those rare individuals who has been in both the art and technical ends of animation production — for twenty-eight years. Additionally, he has the gift of putting down in words and illustration the how and why of commercial animation technique as no other author has done before. Result is one of the finest books on the subject to date.

Comprising 128 pages, the planning, production, filming, and all intermediate steps are clearly explained and illustrated. Indeed, the illustrations are a standout feature of the book and consist of both photos and drawings that show all the actual key steps in creating and putting an animation sequence on film.

For those already in animaiton this book is a source of wide, general information that points to opportunities for advancement in the industry. For the advertising agency producer of commercial films this book should be required reading. For those desiring a career in animated films it is a "must."

1960 International Motion Picture Almanac, *edited by Charles S. Aaronson. Quigley Publishing Co., 1270 Sixth Avenue, New York 20, N.Y. $5.00.*

This is one of several volumes published annually for the motion picture industry and containing a wealth of information for producers, exhibitors, publicists, and many of the technical personnel of the industry. The 1960 edition contains over 800 pages of departmentalized and indexed data plus pages of advertisements about fothcoming productions, industry personalities, and of companies servicing the industry with products, etc. The scope of all this is reflected in the book's 25-page index. Obviously, limited space here precludes summarizing even the most important chapters of the Almanac. It is regarded an authoritative reference book by executives throughout the industry.

TV Tape Commercials, *by Harry Wayne McMahan. Hastings House Publishers, Inc., 151 East 50th Street, New York 22, N.Y. $4.50.*

First in its field, this timely and amply illustrated book clearly explains the what's, why's and wherefore's, plus some do's and don'ts, on the use of TV tape. It studies live TV and film TV techniques, and shows how the tape commercial can combine the best of them. It shows, too, how all this can make the TV advertising message even more effective—and more creative—than it is today.

In nine fully illustrated chapters this book includes: what the tape revolution means to TV commercials; new tape commercials in action in the "big-time" and the "small-time"; the 12 tape advantages and what each can do for commercials; the 6 basic types of commercials; and how to use recorder installations for local commercials.

The Complete Technique of Making Films, *by Pierre Monier. Published by Focal Press Ltd., England. Distributed in the U. S. by The Macmillan Company, 60 Fifth Ave., New York 11, N. Y. $6.00.*

This book was written, not for professional film makers, but for the serious amateur movie maker or cine camera owner with a desire to turn out motion pictures having something of the professional finish that most amateurs strive for but too few achieve.

This 300 page book thoroughly covers every facet of film making technique that is within the realm of accomplishment of the owners of modern cine cameras. When techniques or operations require delineation, diagrams or drawings are supplied to clarify, explain, or show the procedure step-by-step. A valuable chapter is that on "Faults and Remedies," and the book concludes with a comprehensive indexed glossary of terms that will be helpful to the reader.

A Grammar Of The Film, *by Raymond Spotiswoode. University of California Press, Berkeley 4, Calif. $1.50.*

Originally published in England in 1925, this book is an attempt to isolate the fundamental principles of film art and to teach in concrete detail how these principles are well or badly applied in the production of films.

This essential task, shirked or derided by most film critics today, Spottswoode has executed with skill and perception. It is a book for the creative film worker, for the experimenter. ■

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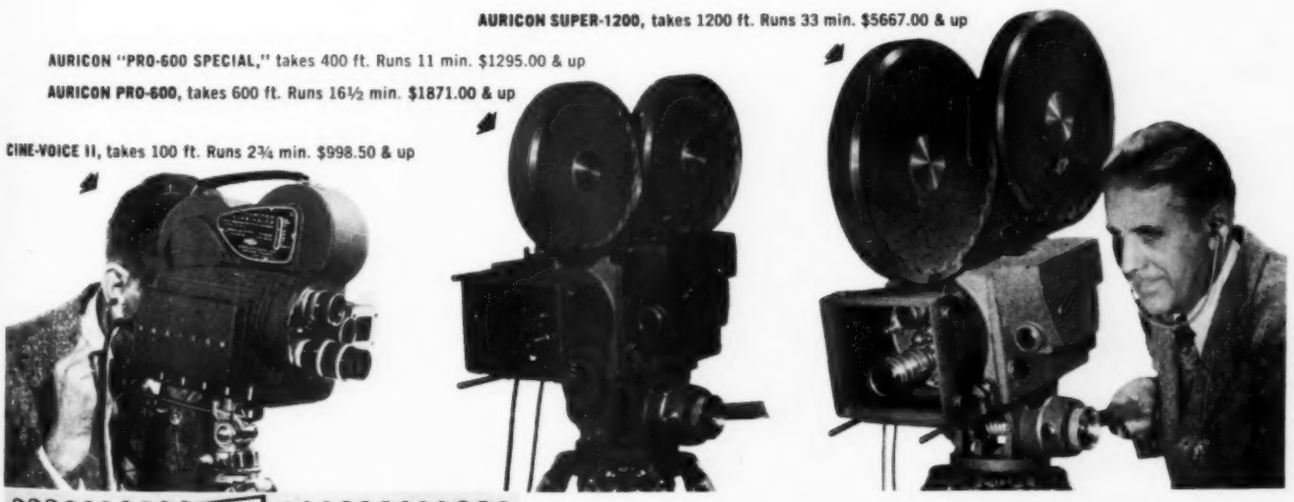

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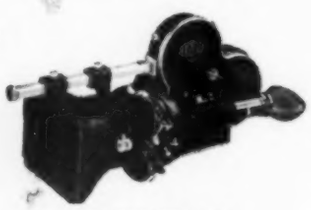

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WALTER STRENGE'S

QUESTIONS & ANSWERS

Need advice on a picture making problem? Your questions are invited and will be answered by mail. Questions and answers considered of general interest will appear in this column each month.

Q On the subject of D-log E curve, exactly what is meant by the statement: "Exposing for the keylight (or highlight)?" Does the density corresponding to the keylight lie on the shoulder and should one always strive to have it there when utilizing the entire straight-line portion of the curve?

Also, will you kindly explain how to handle lighting on a set wherein a man is seated in an easy chair, reading a newspaper. Light from a side lamp is falling on his face but primarily on the newspaper. In the background is a gray wall with a mural painting on it—details of which are faintly visible.

If exposure is set for the newspaper (it being the brightest area in the scene) how far must we reduce the light falling on the wall so that on the screen the details on it are faintly visible? What method is recommended here: reflected light reading or incident light reading? If reflected light reading is recommended, how can we account for the difference in the reflective power of the newspaper and the wall surface?—*J.G.*

Answer: When a professional cinematographer says he is exposing for the keylight, he means that the lens aperture is set according to an incident light meter measurement of the keylight or main source of light falling on the center of interest in the scene. Highly-reflective surfaces in the keylight area should record on the upper straight line portion near the shoulder of the characteristic sensitometric curve for the camera film.

Other parts of the scene are usually illuminated in accordance with the artistic visual judgment of the cinematographer. An exposure meter can be of assistance in the example you have described above, but is not a replacement for the experienced visual judgment of the cinematographer.

Q I have a number of stereo color transparencies which I wish to copy on 16mm color film for use as title backgrounds—double-exposing the title over them. What is the best way to do this?—*W.J.B.*

Answer: Re-photograph the stereo transparencies by rear projection process. For this you will require, besides your stereo slide projector, a panel of matte-surface acetate about 11″ x 14″ in size for your rear-projection screen. Set this up in a solid upright frame.

First, photograph the title text, which should be composed of white letters on black backgrounds. Then cap the camera lens and wind back the film in the camera to the starting point. Set up the camera before the rear-projection screen so that the lens field of view takes in the entire screen area.

Set up slide projector on opposite side of projection screen and adjust projection distance and focus until one frame of the stereo pair is sharply focused and entirely fills the screen. Use the most powerful lamp possible in projector to achieve maximum brightness of image.

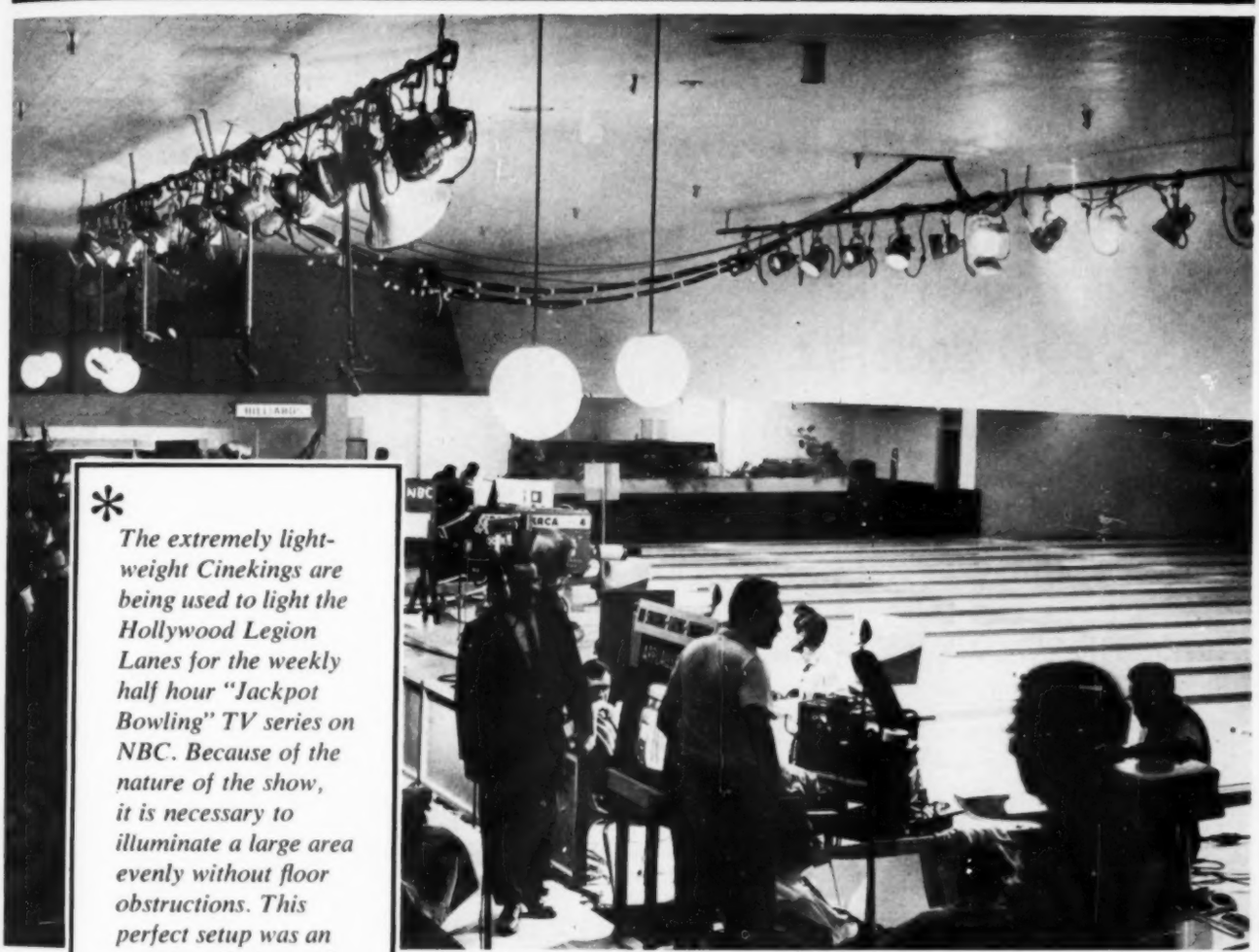
Now photograph the transparencies using the same film that was exposed for the titles. The colors of the transparency scenes will not show through the white lettering if the titles are fully exposed so that letters are white (or transparent on the film). This method will work for either black-and-white or color.

Q How can I produce a realistic effect of low-lying fog or mist that will float close to the ground, around feet of the actors, etc.?—*J.C.D.*

Answer: In motion picture studios this was a highly specialized procedure until the advent of fog-making equipment such as that marketed by Mole-Richardson Co., Hollywood. With this equipment, which is not much larger than a tank-type vacuum cleaner, highly realistic fog and mist effects in varying degrees can be projected into a scene.

Previously, shallow pans filled with fuel oil were heated to produce smoke which then was blown through tubes about six inches in diameter to the set. At the end of each tube was a box of dry ice, which served to lower the temperature of the smoke thereby causing it to remain close to the floor instead of rising. Best results with this method follow where the set or stage is completely free of drafts, and direction of the smoke can be controlled by electric fans.

Milton Berle "Hits the Jackpot" on Jackpot Bowling with Cinekings



* *The extremely lightweight Cinekings are being used to light the Hollywood Legion Lanes for the weekly half hour "Jackpot Bowling" TV series on NBC. Because of the nature of the show, it is necessary to illuminate a large area evenly without floor obstructions. This perfect setup was an easy installation with* ColorTran *and turned a Bowling Alley into a TV Studio.*

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Hal Mohr Honored By Fellow Cinematographers

HAL MOHR (3rd from right) beams happily as he accepts commemorative plaque presented him by the ASC membership on occasion of dinner in his honor at American Society of Cinematographer's clubhouse in Hollywood last month. Making presentation is Arthur Miller (right). Looking on is Lee Garmes, President of the Society, who presided.

CONCLUDING A summer hiatus, regular monthly dinner meetings were resumed by the American Society of Cinematographers on October 24th. The "opener" was a special event honoring veteran cinematographer Hal Mohr.

Officially, it was "Hal Mohr Night," and there was a heavy turnout of enthusiastic fellow craftsmen on hand to greet the former President of the Society (1930-31), holder of two Academy Awards for photography ("Midsummer Night's Dream," 1935, and "Phantom of the Opera," 1943), and recipient of a George Eastman Award (1957).

Present also were many personal friends of Mohr prominent in the industry who enlivened the evening with anecdotes of their experiences with him or lauding his accomplishments over the years. Will Cowan, Vice-president of Filmways of Calif., Inc., whom Mohr worked with during his early days at Universal Studios, spoke of Hal's friendship and helpfulness through the years. Sperry Brown, long-time friend of Hal's, brightened the proceedings with his customary humor and good-natured kidding of the "Great White Father"—a reverent nickname given Mohr years ago because of his spectacular mane of wavy white hair.

Edward O. Blackburn, head of the Hollywood offices of W. J. German, Inc., recalled a friendship with Mohr of more than thirty years duration and cited his integrity as an outstanding Hollywood craftsman. Herb Aller, Business Manager of the Hollywood cameramen's union, cited Mohr's long record of service to and consideration for his fellow cinematographers.

At present Hal Mohr is 2nd Vice-president of Local 659, IATSE (the Hollywood cameramen's union) and also an Officer and Assistant Secretary of The Academy of Motion Picture Arts and Sciences, on whose Board of Directors he has served several terms during the past twenty years.

Mohr was largely instrumental in persuading the Academy two years ago to re-instate its dual annual awards for cinematography.

As a token of its esteem, the A.S.C. presented Mohr with an engraved plaque ". . . in recognition of his contributions to the art of cinematography, his long and brilliant career as a cinematographer, a leader among his fellow craftsmen, and one who has brought honor to the profession."

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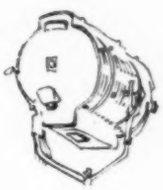

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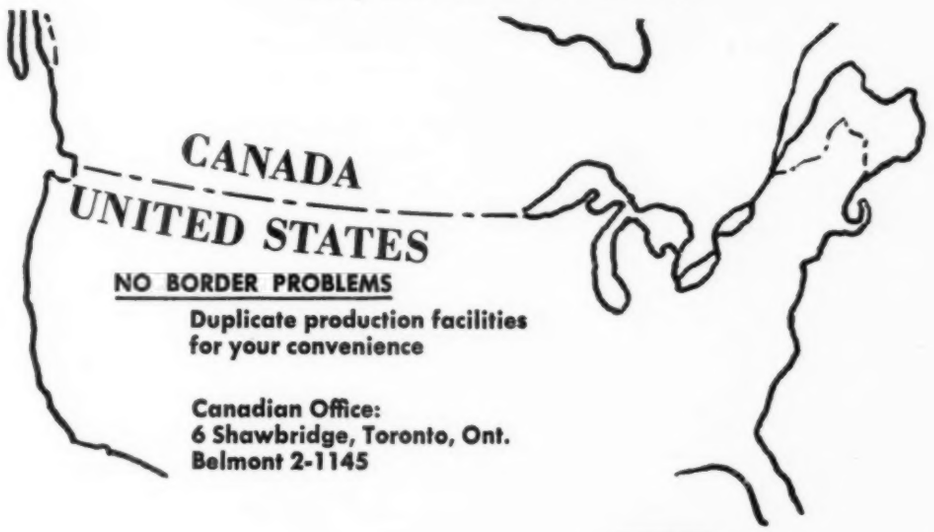

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PHOTOGRAPHIC ASSIGNMENTS

WHAT THE INDUSTRY'S CAMERAMEN WERE SHOOTING LAST MONTH

By MARION HUTCHINS

AMERICAN NATIONAL

MONROE ASKINS, RICHARD RAWLINGS, "Lock-Up"* (Ziv-TV) with MacDonald Carey.

MONROE ASKINS, "The Case of the Dangerous Robin"* (Ziv-TV) with Rich Jason.

RICHARD RAWLINGS, "Aquanaut"* (Ziv-TV) with Keith Larson and Jeremy Slate; "Sea Hunt"* (Ziv-TV) with Lloyd Bridges.

CURT FETTERS, "Bat Masterson"* (Ziv-TV) with Gene Barry.

JACK MARQUETTE, "Klondike"* (Ziv-TV) with Ralph Taeger.

NICK MUSURACA, ASC
Directing the photography of "The Islanders," TV film series at MGM Studio.

CALIFORNIA STUDIOS

RAY FOSTER, ASC, Commercial*.

CASCADE PICTURES

WILLIAM SKALL, ASC, Commercials*.

GEORGE FOLSEY, ASC, Commercials*.

TYLER BYARS, Commercials*.

COLUMBIA STUDIOS

FREDDIE YOUNG, "The Greengage Summer" (Color; P.K.I. Picts.; Shooting in France) with Kenneth Moore and Danielle Darrieux. Lewis Gilbert, director.

OSWALD MORRIS, "The Guns of Navarone" (Color; Highroad Prod.; shooting in Greece) with Gregory Peck and David Niven. Alexander Mackendrick, director.

WILKIE COOPER, "Mysterious Island" (American Films Prods.; shooting in Spain) with Michael Craig and Joan Greenwood. Cyril Endfield, director.

GERT ANDERSEN, ASC, "Donna Reed Show"* (Screen Gems) with Donna Reed. Andrew McCullough, director.

CHARLES WELBORN, "Manhunt"* (Screen Gems) with Victor Jory and Pat McVey. Fred Jackman, director.

HENRY FREULICH, ASC, "Dennis the Menace"* (Screen Gems) with Jay North and Herbert Anderson.

FRED GATELY, ASC, "My Sister Eileen"* Screten Gems) with Shirley Boone and Elaine Stritch. Oscar Rudolph, director.

IRVING LIPPMAN, WILLIAM WHITLEY, ASC, "Dan Raven"* (Screen Gems) with Skip Homeier and Quinn Redeker.

JACK MARTA, "Route 66"* (Screen Gems) with Marty Milner and George Maharis. Philip Leacock, director.

PHILIP TANNURA, ASC, IRVING LIPPMAN, "Two Faces West"* (Screen Gems) with Charles Bateman and June Blair. Harmon Jones, director.

JOSEPH BIROC, ASC, "The Devil at 4 O'Clock" (Shooting in Hawaii; LeRoy-Kohlmar Prods.; C'Scope & Color) with Spencer Tracy and Frank Sinatra. Mervyn LeRoy, director.

GAYNE RESCHER, ASC, "Mad Dog Coll" (shooting in New York; Thalia Films) with John Chandler and Kay Doubleday. Burt Balaban, director.

CHARLES LAWTON, JR., ASC, "Two Rode Together" (John Ford Prod.; color; shooting in Texas) with James Stewart and Richard Widmark. John Ford, director.

DESILU—Cahuenga

SID HICKOX, ASC, "The Andy Griffith Show"* (Desilu Prods.) with Andy Griffith.

ROBERT DE GRASSE, ASC, "Angel"* with Annie Farge and Marshall Thompson. Lamont Johnson, director; "Jack Benny Show"* (Desilu Prods.) with Jack Benny.

PHILIP TANNURA, ASC
Formerly cameraman for the "Burns & Allen Show," Phil Tannura is currently filming "Oh! Those Belles!" for CBS-TV at MGM Studio.

DESILU—Culver City

CHARLES STRAUMER, "The Untouchables"* (Desilu Pods.) with Robert Stack and Jerry Paris.

LUCIEN ANDRIOT, ASC, ROBERT HAUSER, "Guestward Ho"* (Desilu Prods.) with Joanne Dru and and Mark Miller.

LOTHROP WORTH, ASC, "The Real McCoy's"* (Brennan-Westgate Prods.) with Walter Brennan.

DESILU—Gower

MAURY GERTSMAN, ASC, "Barbara Stanwyck Theatre"* (Desilu Prods.) with Barbara Stanwyck.

CHARLES VAN ENGER, ASC, "Lassie"* (Jack Wrather Prods.) with June Lockhart and Jon Provost.

ROBERT PLANCK, ASC, "My Three Sons"* (Desilu Prods.) with Fred MacMurray and William Frawley.

ROBERT HAUSER, "Wyatt Earp"* (Desilu Prods.) with Hugh O'Brian.

ROBERT PITTACK, ASC, "Ann Sothern Show"* (Desilu Prods.) with Ann Sothern.

LUCIEN ANDRIOT, ASC, "Harrigan and Son"* (Desilu Prods.) with Pat O'Brien and Roger Perry.

WALT DISNEY STUDIOS

EDWARD COLMAN, ASC, "John Slaughter"* with Tom Tyron and Betty Lynn. James Neilson, director.

LUCIEN BALLARD, ASC, "Petticoats and Bluejeans" with Hayley Mills and Maureen O'Hara. David Swift, director.

WALTER CASTLE, ASC, "Pop Warner Football"*

FAIRBANKS STUDIO

RAY FOSTER, ASC, Commercial*.

FOX WESTERN AVENUE

JAMES VAN TREES, ASC, "Dobie Gillis"* with Dwayne Hickman. Rod Amateau, director.

LUCIEN ANDRIOT, ASC
Andriot's name long was on the credits for the "Amos 'n Andy" TV film series. He's currently shooting the "Guestward Ho!" video films at the Desilu Culver City studio.

GENERAL SERVICE STUDIOS

FRANK REDMAN, ASC, "Perry Mason"* (CBS-TV) with Raymond Burr and Barbara Hale.

MEREDITH NICHOLSON, "Blue Angels"* (Gallu Prods.) with Don Gordon and Morgan Jones.

HAROLD LIPSTEIN, ASC, "Adventures of Ozzie and Harriet"* (Stage 5 Prods.) with the Nelson family. Ozzie Nelson, director.

HARRY WOLFE, "Hennessey"* (Hennessey Prods.) with Jackie Cooper. Don McQuire, director.

JOHN ERCOLE, Commercial* (Filmways, Inc.).

GOLDWYN STUDIOS

WALTER STRENGE, ASC, "Outlaw Brother" (Zenith Pictures; UA release) with James Brown and Joan Staley. Edw. L. Cahn, director.

NORBERT BRODINE, ASC, EUGENE POLITO, "Loretta Young Show"* (Toreto Prods.) with Loretta Young.

INDEPENDENT

HASKELL WEXLER, "The Hoodlum Priest" (Murray-Wood Prod. for UA; shooting in St. Louis) with Don Murray and Larry Gates. Irving Kershner, director.

HAROLD STINE, ASC
Has photographed some of every TV film series produced at Warner Brothers, but is currently shooting "Surfside Six."

GILBERT WARRENTON, ASC, "Master of the World" (Dyna-Magic & Color; American Int'l Picts.) with Vincent Price and Charles Bronson. William Witney, director.

HENRY CRONJAGER, "The Answer!" (Glenwood-Neve Prods.) with Paul Lukather and Joan Harvey. Newton Arnold, producer-director.

FLOYD CROSBY, ASC, "Aces Up" (Shooting in Canada; Zenith Pictures for UA) with Jim Davis and Merry Anders.

Continued on Page 695

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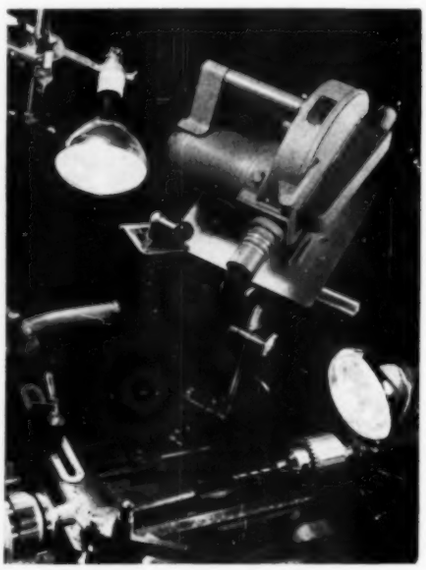
High-speed Photography In Research And Industry

Technical conclave reveals growing use of high-speed photography as a basic industry tool.



MANY PRODUCTION problems can easily be solved when analyzed by the high-speed motion picture camera. Resultant film, when screened, shows operation in slow motion so that any flaws in tool performance or the material used, or faulty operation of the machinery may be observed and corrected.

EFFECTIVE INDUSTRIAL applications of high-speed photography were described in a number of technical papers on the subject presented during the recent SMPTE-sponsored Fifth International Congress on High-speed Photography in Washington, D.C.

Speaking on the subject "The Use of High-speed Photographic Techniques in Research and Industry," R. Wayne Anderson of Dow Chemical Company discussed the economics of high-speed photography as a basic tool in research and industry and demonstrated specific examples of dollars-and-cents savings as a result of the use of the medium.

Results of a spot-check survey of non-military users of high-speed cameras and how they are used were presented to show the tremendous increase in the use of high-speed photographic techniques in the last 10 years, and the potential use of high-speed photography as a basic industry tool. Shown also were examples of the wide variety of users of high-speed photography in research and industry. Anderson concluded his presentation with a discussion of the types of cameras generally used for HS filming in industry, and the general trend toward development of higher-speed cameras, simpler and more effective light sources and analytical equipment.

In a paper titled "The Micro-photography of Dilute Fiber Suspensions Moving at High Speed," presented by E. L. Scott of the Mead Corporation, Chillicothe, Ohio, the important part played by high-intensity stroboscopic illumination was examined. The development and commercial availability of high-intensity, short-duration lights, such as the Strobolume, and the extremely fast action magnetooptic Rapatronic shutter has made possible the development of a technique for successful stop-motion cinematography of flowing cellulose fiber suspension in water moving at a speed of 25 to 30 feet per second, according to Scott.

In order to provide a uniformly illuminated field, this technique utilizes a Fresnel field lens between the light source and the subject, plus an auxiliary lens assembly between the Rapatronic shutter and the subject to provide the desired magnification.

"High-speed Photography in the Development of a New Form of Pulverizer," was subject of paper presented by R. Jackson and D. V. Simpson of the British Coal Utilization Research Association, Leatherhead, Surrey, England.

The paper revealed that normal methods of exploration of the performance of a new pulverizer used by the British coal industry gave anomalous results that were not easily explained. High-speed photography of the flow of particles through the pulverizer revealed directly many of the causes of these anomalies. Subsequently the mill was re-designed, based on the photographic findings, and high-speed photography again is being

Continued on Page 658

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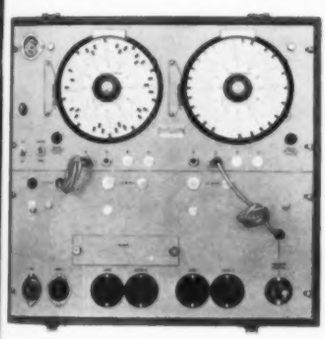

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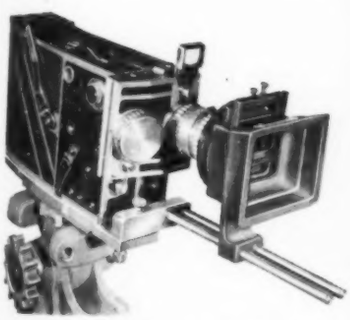

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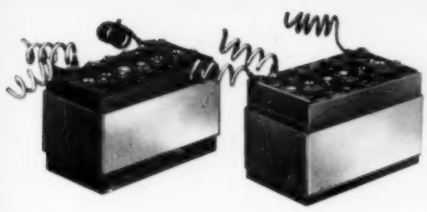

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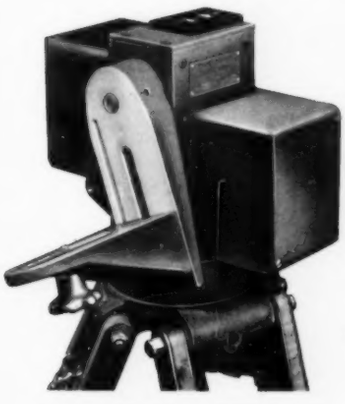

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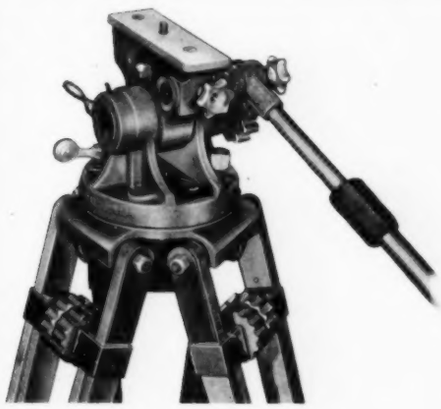

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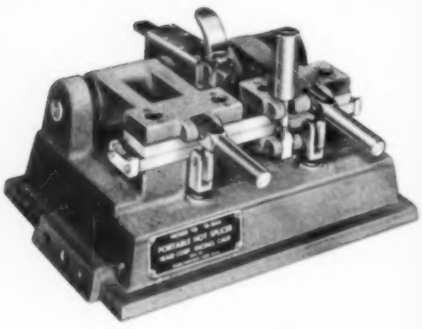

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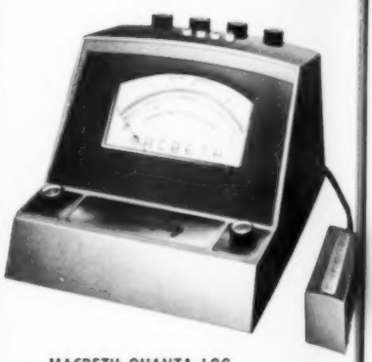

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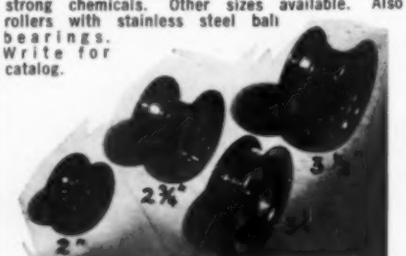

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HIGH-SPEED PHOTOGRAPHY

Continued from Page 654

used as a tool in the investigation of its performance.

The high-speed photography technique used is straightforward, according to Jackson and Simpson. A Fastax camera is employed at speeds up to 1000 frames per second. The major problems encountered, the authors point out, were the inaccessibility of subject and how to provide sufficient light for photography, since the material to be photographed was pulverized coal.

High-speed photography applications in the food canning industry was interestingly presented in a paper by C. C. Collier of Food Machinery and Chemical Corp. in conjunction with J. J. Larnish of Ansco, entitled "Fundamental Research and Theories in Canning Machinery."

Because the canning industry has grown to be a high-speed production operation in recent years, the change has necessitated a parallel improvement in canning machinery design. To help speed fundamental research and development in this direction, Food Machinery and Chemical Corp. has made extensive use of high-speed motion pictures. One such project was a high-speed camera study of juice-filling operations which led to the design of improved, faster-flowing valves in the juice-canning equipment.

Other high-speed camera studies included the operation of machines such as bean snippers, piston displacement fillers, corn huskers and corn cutters. Here high-speed motion pictures enabled engineers to observe high-speed mechanical operations in slow motion on the projection screen, which provided them with additional methods for improving the equipment for more efficient results.

Even outboard motors — certainly one of the fastest moving pieces of modern-day machinery—have come in for probing by the discerning eye of the high-speed camera. Concluding the Industrial Applications session of the High-speed Photography Congress was a paper titled "A Variety of Marine Applications of High-speed Photography," by Daniel H. Lamb, Research Center, Outboard Marine Corporation, Milwaukee, Wisc.

At the Research Center, Lamb explained, the company's various prod-

Continued on Page 703

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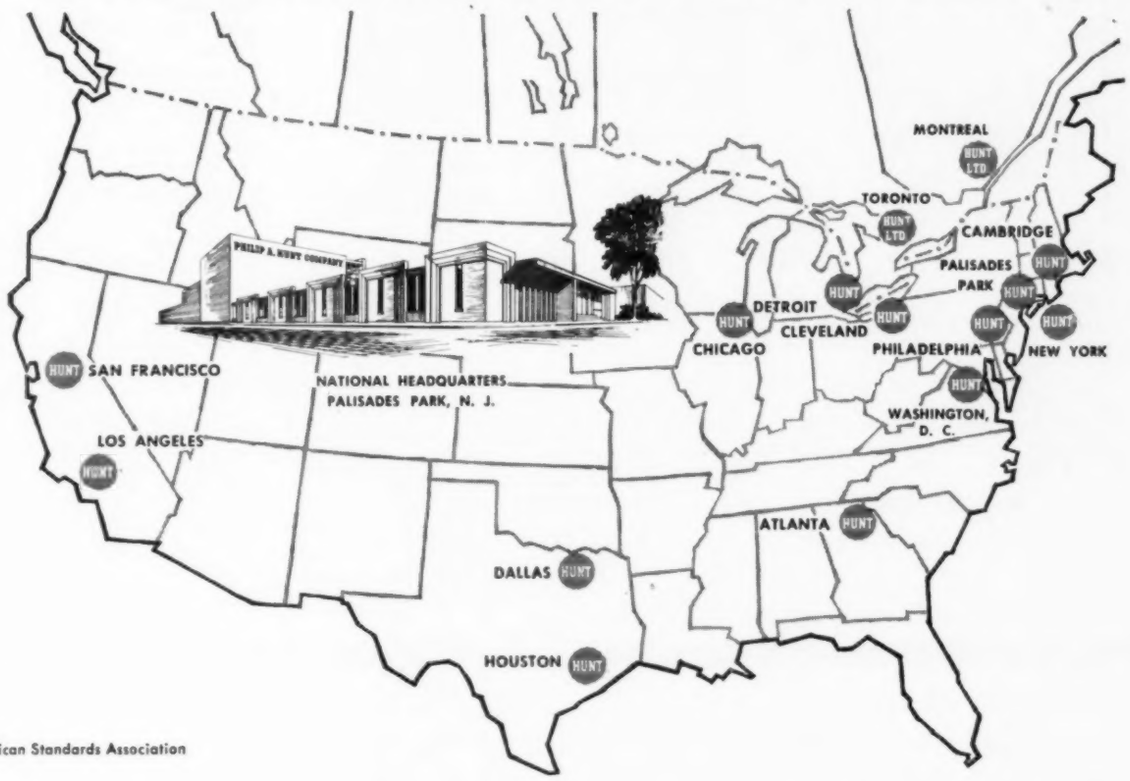

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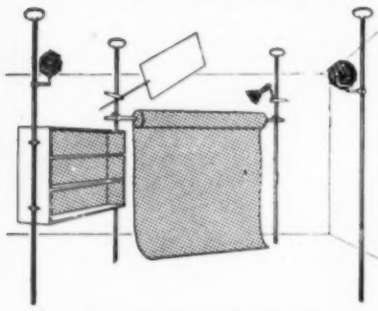

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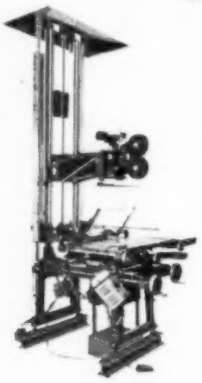

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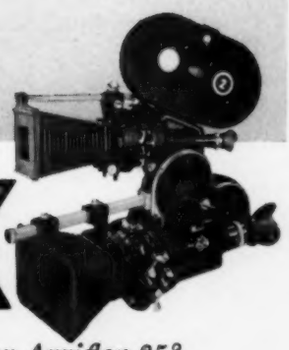

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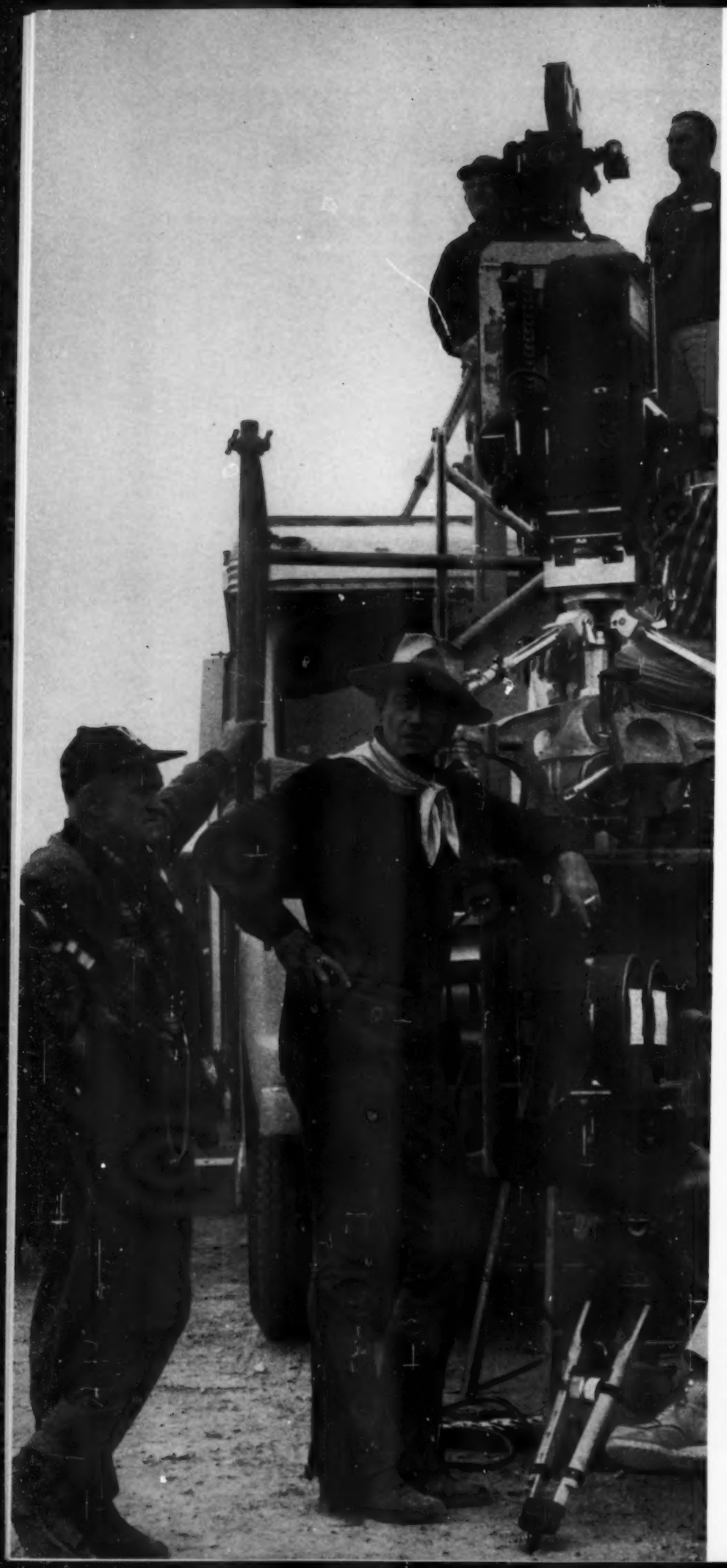


Filmin

By HERB A. LIGHTMAN

IT IS GENERAL PRACTICE in filming an outdoor epic to shoot the key exteriors — often just the establishing long shots—on location, then return to Hollywood to shoot the matching, closer exteriors plus all the interiors in the comfort and convenience of the studio lot or sound stage "The Alamo," produced and directed by John Wayne and photographed by William H. Clothier with Todd-AO cameras, is an exception—a singular exception.

All of "The Alamo" was shot on location, both interiors and exteriors, on a vast practical set erected on location near Brackettville, Texas. Producer Wayne spent a million-and-a-half dollars here in the construction of an authentically-detailed and proportioned replica of the famous Alamo and the adjoining town of San Antonio de Bexar as it existed in 1836. And it was built, for the most part, not as the conventional movie set, with false fronts, wild walls and painted details, but of brick and stone and adobe in the form of complete structures having floors, ceilings, and practical walls, doors and windows.

This was not done with any dis-

THREE CAMERAS, THREE LEVELS—Director of Photography William H. Clothier, far left, and John Wayne, star, director and producer of "The Alamo," wait for actors and horses to get into places before signalling camera operators to roll the cameras on upcoming battle scene. Clothier supervised operations of five separate camera crews for many of the action scenes.

The Alamo" In Todd-AO

William Clothier used as many as five cameras at one time to film some of the action scenes for John Wayne's epic color production of the historic thirteen-day battle for Texas liberty.

dain for the cameraman's problems, but rather to impart the utmost authenticity in the pictorial rendition of the action that was to take place there. The great amount of shooting by Hollywood studios on actual locations in recent years has brought new concepts in set construction, because the industry's cinematographers have, with resourcefulness and imagination, demonstrated that it is possible to photograph action within small confines regardless of the camera and lighting equipment at their disposal.

Because many of the structures were two-story and were built "practical" to withstand violent extremes of weather, there were no "wild" walls and no ceilings that could be removed temporarily to facilitate lighting and camera angles. For this reason it became a never-ending struggle for Clothier and his crew to fit lights, camera and crewmen into a room along with the director, his assistants and the actors.

Low Set Ceilings A Problem

Here, Clothier's main problem was the difficulty of placing lights and camera for the most effective composition. And since he was shooting with the earlier and slower type Eastman Color Negative, a great deal of light was required to get an exposurable key in interiors. Added to this was the problem of the low ceilings which precluded mounting key lights at the desired elevation. Despite such restrictions, however, Bill Clothier's photography in no instance reveals any compromise with quality. The interiors of "The Alamo" are lighted and photographed with artistry, with the result often reflecting the quality of fine old paintings.

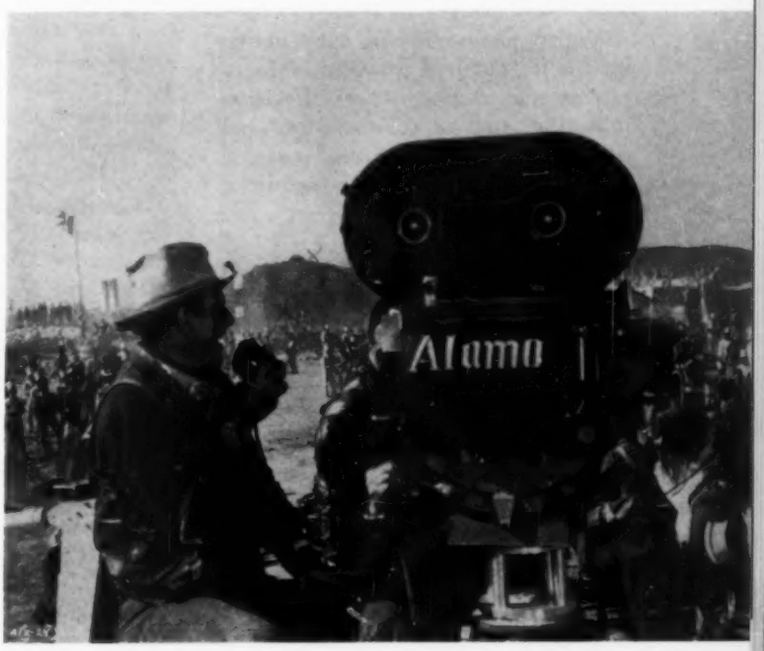
The variable Texas weather, was, of course, a constant bugaboo during production. Temperatures ranged from 120° down to 21°. The company was plagued with violent rain squalls and windstorms, as well as fog. The big cattle stampede, a climactic sequence of the picture, was scheduled to be shot about 6:30 one evening. A rugged area of brushland had been chosen and staked out as the site for the action. Arc lights and cameras were set up on parallels and a great herd of cattle was moved into position. Suddenly a fierce electrical storm hit, and within a little over an hour more than 2½ inches of rain had pelted down. Intermittent sheets of lightning and crashes of thunder brought the frenzied cattle again and again to the verge of stampede (a common occurrence in the days of the Old West), but a corps of expert wranglers managed to hold them in check. As soon as the rain stopped the company started to shoot in mud literally up to its knees.

Natural Fog Effective

Another miserable evening found the company bedevilled by a windstorm, with gusts of 50 knots an hour blowing out of the North and the temperature just barely above freezing. Wrapped in blan-

Continued on Page 699

FROM THE CAMERA BOOM, John Wayne, making his debut as a film director, calls for action from cast of thousands in climaxing scene of "The Alamo." Production was shot in color with Todd-AO widescreen cameras—one of which is shown here being lined up on the action by the operator.



Photographic Instrumentation For Shipboard Polaris Missile Tests

How motion picture cameras, strategically placed, provide graphic performance reports of Fleet Ballistic Missiles fired from the Navy's developmental launching ship.

By GEORGE TAKENAKA*

SHORTLY AFTER THE turn of the century when moving pictures were heralded as a new entertainment medium, there was no thought that the motion picture camera one day would become an important tool of the scientist and researcher. Today, motion pictures exposed at speeds ranging from one frame per second or less up to 125,000 frames per second provide important information in the development of missiles, aircraft, and a score of other subjects, classified and unclassified.

Equipment engineers—particularly photo instrumentation engineers—in recent years have developed motion picture cameras of radical design and infinite precision that are capable of photographing objects moving at incredible high speeds. Such cameras provide single-frame exposures of unbelievable sharpness or slow-motion movies that show a missile's performance in a way impossible to observe with the human eye.

Motion picture photography of this kind is far removed from cinematography as applied to theatrical, television, industrial and educational films. Although essentially the same cameras are often employed, photo instrumentation is a new and specialized science in which the cameras, in most instances, are remote controlled and the "cameramen" are scientists or instrumentation engineers first and photographers second.

FIG. 1—Starboard enclosure for the close-in engineering surveillance cameras. Inside are two 35mm Eyemos banked to provide coverage through zenith.

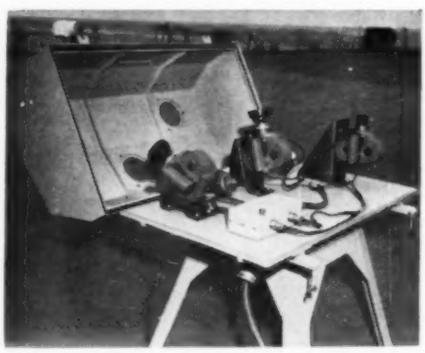


FIG. 2—The port station, located directly behind the launch tube, consists of three 35mm cameras—two with wide-angle lenses and the third with a 35mm lens.

A recent major instrumentation undertaking, which typifies the present scope of this important new science, was that designed to provide data for test evaluation of the Navy's Fleet Ballistic Missile (FBM) Weapon System. The instrumentation components were developed and fabricated by Interstate Electronics Corporation and installed aboard the Navy's developmental surface launch ship USS Observation Island, as shown in the diagram, Fig. 4.

This article will cover only the photographic and associated phases of the instrumentation. The equipment to be described photographs the initial phase of the FBM launch and was designed to be used under all weather conditions. It is remotely controlled to eliminate the necessity of hazardous operation from above-deck positions.

Early in the ballistic missile program, the need for a means of delivering an intermediate range ballistic missile (IRBM) to a remote enemy target was recognized. To this end, a seaborne platform for missile launching was desired. At that time, the only suitable missile which was approaching production was the Jupiter IRBM. The preliminary instrumentation designed in this program was for the deck launch of the Jupiter missile.

The hazards associated with the utilization of liquid propellant rockets, such as Jupiter, are great and extreme precautions were taken in the preliminary design of the instrumentation equipment in case of catastrophic failures. Fortunately, the advance in the state of the art of nuclear warheads and solid propellants made realizable a solid propellant IRBM of a size compatible with nuclear submarines. As a result, the Polaris missile was conceived and the instrumentation was modified to accept the solid propellant Polaris in replacement of the liquid propellant Jupiter. The

FIG. 3—Tracking engineering surveillance mount has two 35mm Eyemo cameras plus two Kin Tel TV cameras.

*Senior Project Engineer, Ling-Temco Electronics, Anaheim, Calif.

difference in basic characteristics of the two missiles entailed considerable change from the original instrumentation to the final unit which will be described.

In the development of a weapons system, metric instrumentation is necessary to provide engineering data to verify theoretical calculations and to determine causes of failures. The basic principle of instrumentation is to provide not only for success but also for failure. This philosophy then permits the determination of causes of erratic operation and in many cases provides information for remedial action.

The expected performance of the missile was carefully analyzed and the photographic instrumentation array studied in detail to determine if the equipment would provide the data with the required accuracy. The various photographic equipments fall within the three basic functional categories: engineering surveillance, emergence, and initial trajectory. Additional support areas were also provided for such as television, still and motion picture photo labs, data inspection facilities, timing, instrument control, etc.

The engineering surveillance equipment provides photographic engineering surveillance data from which missile behavior can be analyzed. Documentary coverage is provided simultaneously when the timing signals are deleted from the film. The primary engineering surveillance equipment consists of 35mm motion picture coverage.

The emergence system consists primarily of 35mm cameras located around the launcher, providing 360 degree coverage of the missile. In addition, a 16mm high-speed camera provides detailed coverage of emergence vs time.

The initial trajectory camera installation consists of 70mm pulse cameras which are arranged to provide trajectory information from launch to 2,000 feet altitude. This coverage is necessary to provide complete trajectory history from missile emergence until shore-base installations, such as phototheodolites or AZUSA, can acquire and track the missile.

Engineering surveillance coverage is desirable from launch to the limits of the optics. In order to achieve this, it was necessary to utilize both extremely wide-angle lenses and telephoto lenses. The close-in engineering surveillance cameras located around the launcher are equipped with 18mm

Continued on Next Page

"A" CAMERAS
Trajectory camera installations. Consisting of 4 pulsed aerial reconnaissance cameras with 38mm wide-angle lenses having 72° field of view, for plotting missile trajectory.

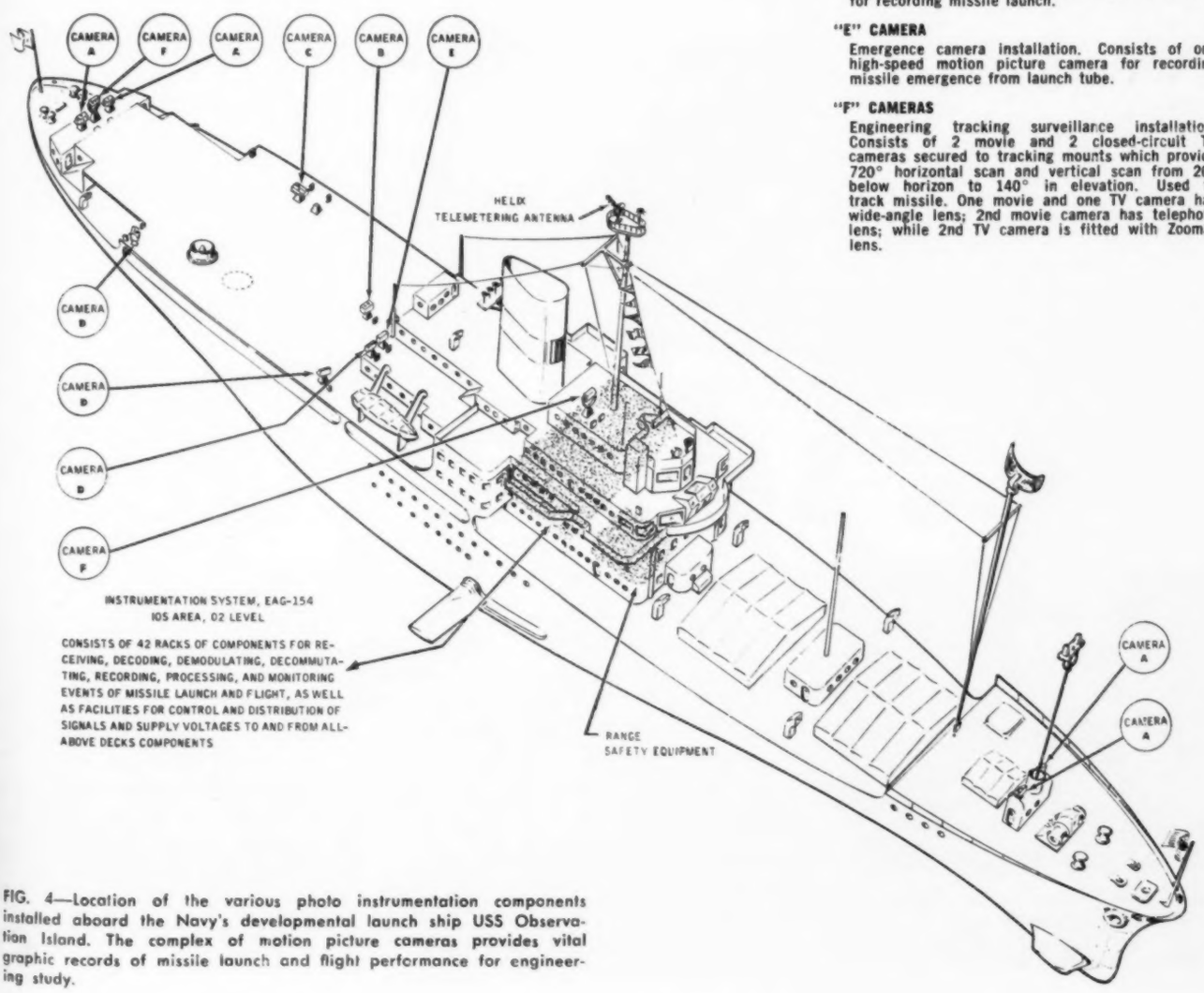
"B" CAMERAS
Unit comprises 2 pulsed aerial reconnaissance cameras with 80mm lens for plotting trajectory.

"C" CAMERAS
Engineering surveillance installation. Consists of 3 movie cameras with wide-angle lenses for recording missile launch and climb.

"D" CAMERAS
Similar to "C" set-up but consisting of 2 cameras for recording missile launch.

"E" CAMERA
Emergence camera installation. Consists of one high-speed motion picture camera for recording missile emergence from launch tube.

"F" CAMERAS
Engineering tracking surveillance installation. Consists of 2 movie and 2 closed-circuit TV cameras secured to tracking mounts which provide 720° horizontal scan and vertical scan from 20° below horizon to 140° in elevation. Used to track missile. One movie and one TV camera has wide-angle lens; 2nd movie camera has telephoto lens; while 2nd TV camera is fitted with Zoomar lens.


CAMERA A
CAMERA F
CAMERA A
CAMERA C
CAMERA B
CAMERA E
HELIX TELEMETERING ANTENNA
CAMERA D
CAMERA D
CAMERA D
CAMERA F
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RANGE SAFETY EQUIPMENT
CAMERA A
CAMERA A

FIG. 4—Location of the various photo instrumentation components installed aboard the Navy's developmental launch ship USS Observation Island. The complex of motion picture cameras provides vital graphic records of missile launch and flight performance for engineering study.

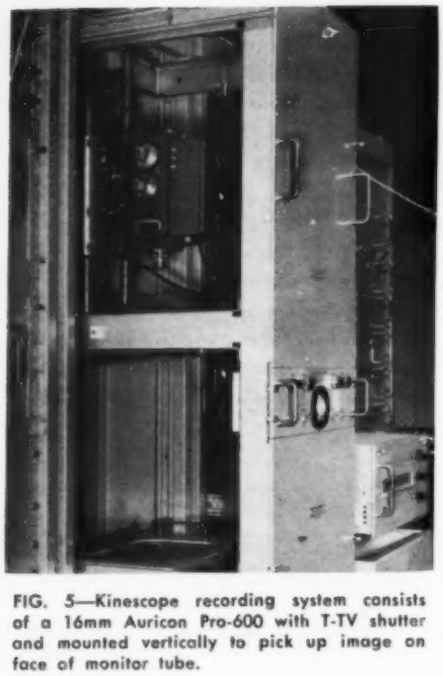

FIG. 5—Kinescope recording system consists of a 16mm Auricon Pro-600 with T-TV shutter and mounted vertically to pick up image on face of monitor tube.

wide angle-lenses. The starboard enclosure is shown in Figure 1. It consists of two 35mm Eyemo cameras banked to provide coverage through zenith. These cameras are operated at 48 frames per second and are located within the protective enclosures. There are two such stations with similar equipment located on the starboard side.

The port station, which is located directly behind the launch tube, consists of three cameras and is shown in Figure 2. Two of these cameras are equipped with 18mm wide-angle lenses, and the third camera is equipped with a 35mm lens. The wide-angle lenses provide coverage through zenith, while the 35mm lens is designed to cover the trajectory of the missile as it goes further away from the ship.

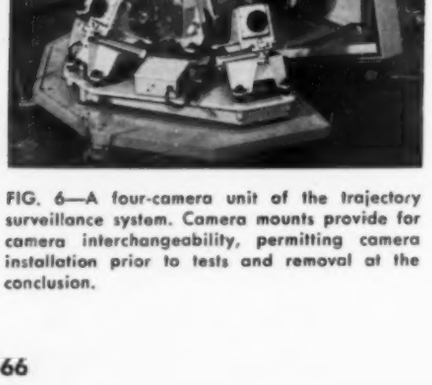

FIG. 6—A four-camera unit of the trajectory surveillance system. Camera mounts provide for camera interchangeability, permitting camera installation prior to tests and removal at the conclusion.

The tracking engineering surveillance cameras differ from the stationary cameras in that they are mounted on Houston-Fearless tracking mounts. This mount was orignally designed to position microwave antennas and was specially modified to meet the requirements as a camera tracking mount. It is capable of angular velocities of 30 degree per second, and angular accelerations of 30 degrees per second squared. The mount, shown in Figure 3, carries in its yoke a housing which has two 35mm Eyemo cameras and two Kin Tel television cameras. The Eyemo cameras are equipped with a 35mm lens in the after camera and a 60mm lens in the forward camera. The telephoto unit in each is a 250mm lens. The television cameras in the enclosures are equipped with a 10mm wide-angle lens and a Zoomar lens with a range of 30mm to 150mm.

The mount tracking rate is proportional to the angular displacement of the stick. Other controls are readily available, and the operator can select either the wide-angle or Zoomar lens-

FIG. 7—Aligning the mounts for the four cameras employed in the fore and aft trajectory camera stations.

equipped camera to permit more accurate tracking. All of the television cameras have remote control settings by which the lens aperture and all other electronic settings can be made from the console.

In the original planning, it was determined that the Zoomar lens would provide sufficient coverage. However, human engineering studies conducted by Dunlap and Associates, Inc. indicated that a wide-angle lens on the television camera was desirable for ease of tracking. In accordance with their recommendation a 10mm fixed-focus lens was installed on the second camera unit.

The hazard encountered during launch of a ballistic missile does not

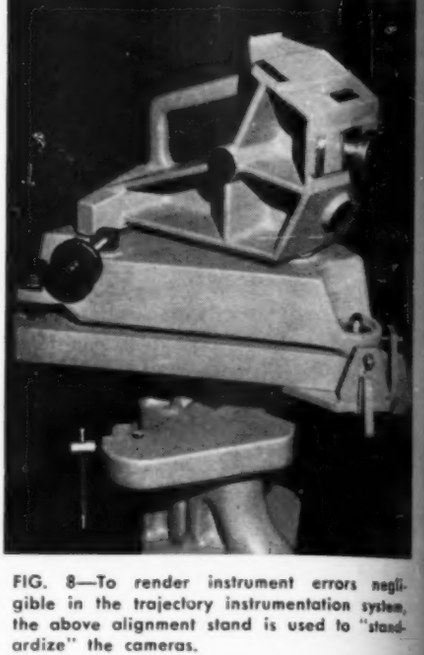

FIG. 8—To render instrument errors negligible in the trajectory instrumentation system, the above alignment stand is used to "standardize" the cameras.

permit the presence of operating personnel in exposed areas. It was therefore necessary to provide for remote operation of the engineering surveillance tracking mounts. To this end, a television view finder was incorporated with the remote-control tracking platform. The combination of the two television cameras plus a variable control tracking mount permits precise following of a missile from launch to the limit of the photographic and television optics.

A Kin Tel Closed-Circuit Television System serves as a view finder for the tracking camera system. As noted above, each installation consists of two television camera systems: one equipped with a 10mm wide-angle lens, and the other with a Zoomar lens. The wide-angle lens allows the missile to be tracked during the period of high acceleration and angular rate of change. As the missile recedes and the angular rate of change decreases, the operator can switch to the Zoomar-equipped camera and adjust the focal length to provide the most accurate tracking combination.

The emergence camera system consists of the three engineering surveillance cameras located in the immediate launch area and the Eastman High-Speed camera. The enclosure can be rotated in Azimuth and tilted to provide the required coverage. A 13mm wide-angle lens was specially

Continued on Page 689

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LOADING FINE-GRAIN master positive into magazine of aerial image projector is co-author Francis Lee. Looking on is Ralph Lopatin, in whose studio is located the equipment shown—an Oxberry animation stand plus Oxberry aerial image projector, both used to produce effects described in article beginning on this page.

Speciaff

By FRANCIS LEE
Motion Picture Consultant, New York
and
VERN W. PALEN
Animation Equip. Corp., New York

BY UTILIZING AERIAL IMAGE projection with a professional animation stand, a cameraman having animation or stop-motion photography experience can produce animation and optical effects at a considerable saving of time and money, and achieve superior results.

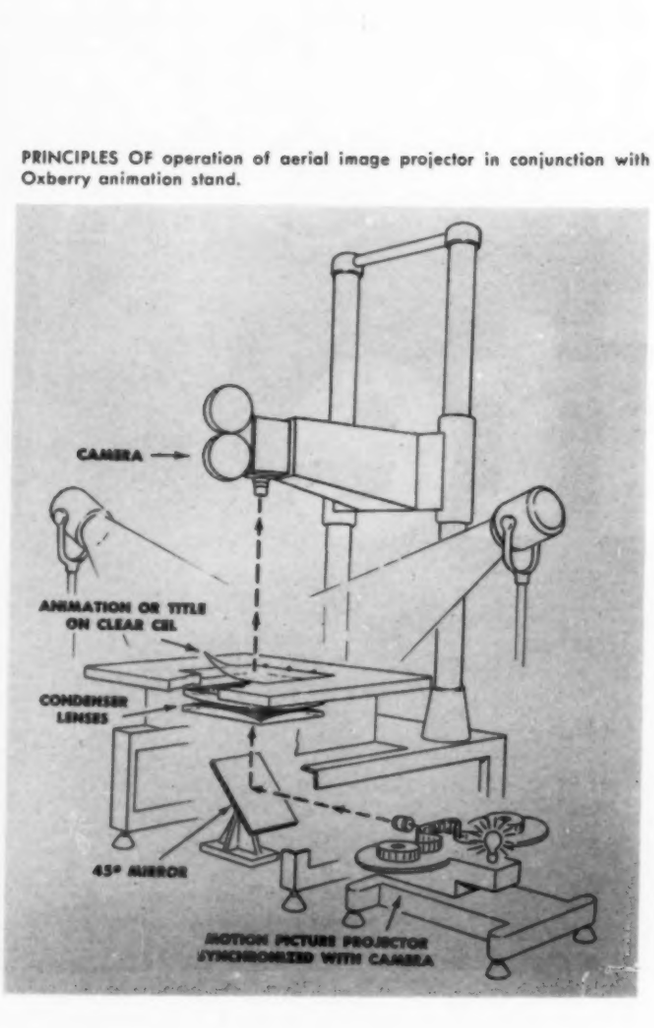
The major advantage of the aerial image technique over the traveling matte system is that, with aerial image, matte bleed is eliminated and there is no matte distortion. Thus maximum quality is retained in the answer print because there are no film generations in between—no intermediate steps.

Composite Scene In One Operation

In animated film production, aerial images are introduced by means of "underneath projection" (see illustration at left); the animation camera photographs the top-lighted cel (or product placed thereon) and an underneath-projected image simultaneously, resulting in a composite scene or setup in a single photographic operation.

"Self-matting" is, perhaps, one way to describe the operation of the aerial image unit. With the latter, it is possible to do color work, 16mm-to-16mm (one-to-one) plus blowups and reductions. A split-

PRINCIPLES OF operation of aerial image projector in conjunction with Oxberry animation stand.



THREE-WAY split-screen effect produced with aid of aerial image projector in a simple three-step operation that saved time and money.

ffects Without Mattes

How aerial image opticals can expedite production of effects, cut laboratory costs, and avoid the quality loss inherent with multiple-generation printing procedures.

screen effect can be accomplished in half the time and at half the cost of matte procedures.

How live action and animation are combined through use of aerial image projection is illustrated in the accompanying drawing which shows an Oxberry Aerial Image projector in operation in conjunction with an animation stand. The projector shutter is synchronized and interlocked with that of the animation camera, so that both shutters open and close simultaneously for an effective exposure. The live action (on film) is projected and diverted upward towards the animation cel board as shown. Here the image becomes "aerial"—suspended in space—just below the animation cel, and is recorded simultaneously by the animation camera along with the animation art work or other object or material, much the same as in background projection. Indeed, the method could very well be termed the background projection procedure for animation.

Need For Bi-pack Films Eliminated

To superimpose a title, trademark, or picture of a product over a live action scene, such as we see in many TV commercials today, the artwork or product is handled in the conventional way on cels, which are positioned on the platen of the animation stand. The motion picture film carrying the live action scene to be used is threaded in the aerial image projector, then the animation camera is loaded with negative—color or black-and-white—as the case may be. The artwork or product and the live action background are then photographed in a "single pass" or exposure by the camera. The need for bi-pack films is eliminated and no high-contrast positive and negative film mattes need be made. Thus, multiple runs (exposures) are avoided; there are no burn-throughs, no hold-backs, no bleeding at the edges as often occurs in opticals made by traveling matte methods.

In addition to its value for producing quickly and inexpensively animation titles with art or live-action backgrounds, aerial image can be employed to blow up, reduce, or re-position a scene in the film frame—35mm-to-35mm, 16mm-to-16mm, 16mm-to-35mm, or 35mm-to-16mm, black-and-white or color.

Typical of the ease with which split-screen effects can be accomplished is that produced for a recent 20-minute 16mm color business film, "Two Keys To Faster Service," produced for the Consolidated Edison Company of New York. Purpose of the film was to show customers new methods that were being used by the company in compiling and billing monthly statements by means of its new IBM installation.

Unique Split-screen Effects

The split-screen effect was used to dramatize a typical customer complaining about a supposed billing error. The scene opened with the customer conversing by telephone with a service company representative. This was enlarged to a split-frame effect

Continued on Page 694

LE of 16mm color film enlarged to and used as title background. Title with drop shadows are superimposed.

EXAMPLE OF animation and product illustration superimposed over live action projected via aerial image in a single operation.

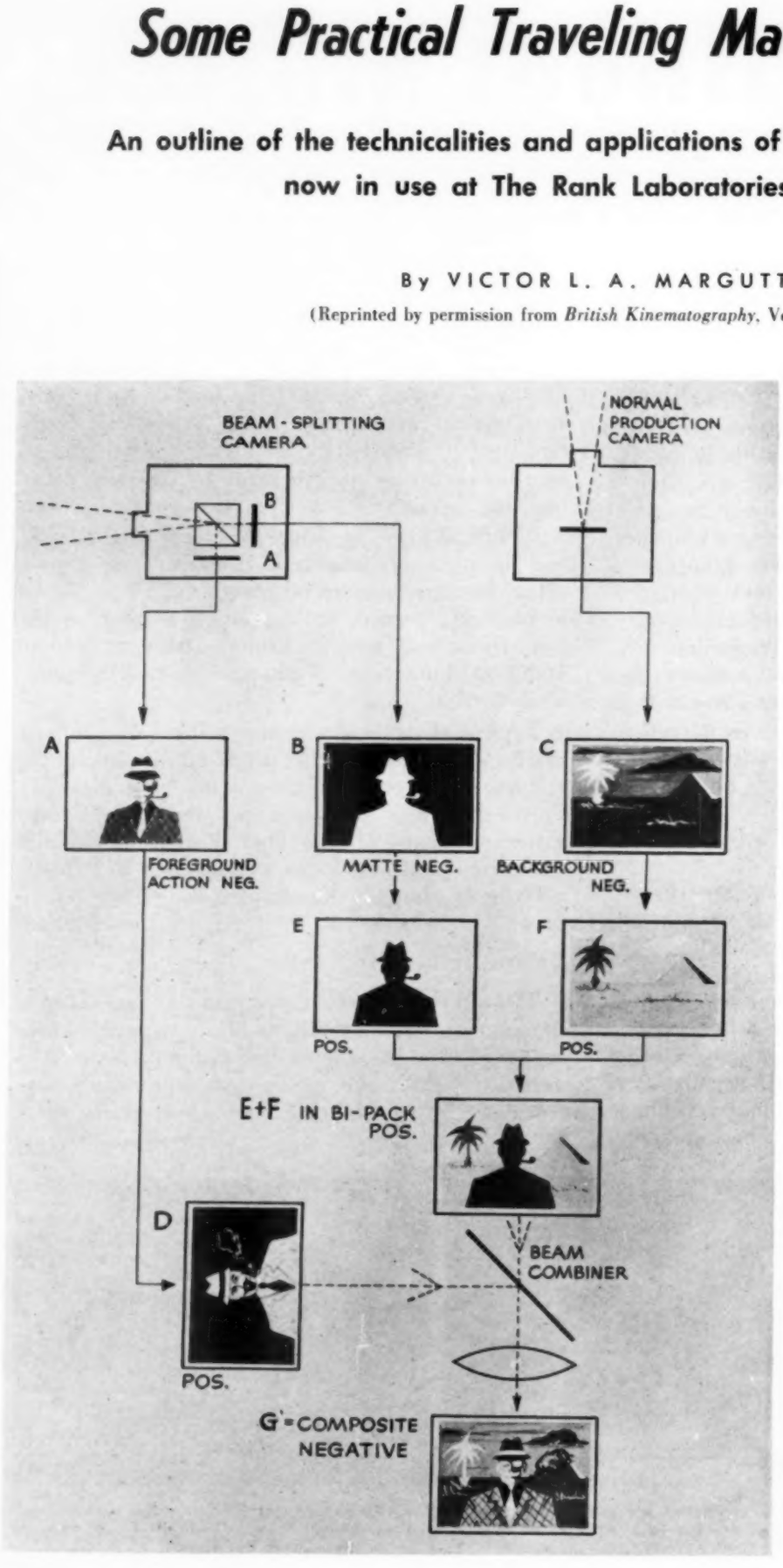
MARLBORO TV spot in which actual pack of cigarettes was photographed simultaneously with the aerial image action background.

Some Practical Traveling Matte Processes

An outline of the technicalities and applications of three patented processes now in use at The Rank Laboratories, London.

By VICTOR L. A. MARGUTTI

(Reprinted by permission from *British Kinematography*, Vol. 36, No. 5)



FLOW DIAGRAM shows progressive steps that produce a composite negative by traveling matte process, using a beam-splitting camera or a normal production camera such as the Mitchell or Newall.

THE TRAVELING MATTE PROCESS is a system for making composite motion pictures, in which the foreground and the background are photographed at different times and places, and later combined into one single image.

In motion picture production today, a scene is often required which is difficult or impossible to achieve by straightforward photography. In such instances, the traveling matte process is employed more and more to produce the scene in a composite operation.

Historical Survey

Composite motion pictures have been made by one method or another since the early days of movies. *King Kong* was made about thirty years ago, aided by the Williams Traveling Matte Process; and the inventor, Mr. F. D. Williams, had obtained a patent for a traveling matte process in 1918!

In a number of processes the background image was printed directly on to the negative of the action by running a toned print of the background through the camera in front of the unexposed film. The actors were illuminated by light of the same color as the toned background plate, and performed in front of a plain backing illuminated by light of a complementary

WHAT TRAVELING MATTE CAN DO

A composite scene is created in which the background has production value. It is thus very suitable for scenes depicting ships at sea, planes in the sky, or vehicles moving on land.

The technique of deep focus photography has more scope with traveling matte, since scenes may be produced having an extraordinary large depth of field.

In trick work, actors may be portrayed in conjunction with miniatures, with the latter magnified to any desired scale.

Dangerous situations can be simulated, such as an actor suspended over a busy street. (See photo below).

Scenes can be produced which have no counterpart in real life, such as of giants and pygmies, or the same person appearing two or more times at once.

A producer with only a small stage may embark on ambitious types of productions without ever going outside his studio, and much of his set construction can be replaced with still photographs of the real thing.

Exteriors can be shot in the studio without any regard to weather conditions and the other hazards which are part of the normal location.

Traveling matte provides readily a sharp focus background, which may, however, be varied later as required.

Use of the T.M. process results in great economy in floor space and shooting time.

It enables the producer to change the background of a composite scene at will, and the backgrounds may be shot before or after the foregrounds.

There is no restriction on the degree of tilt of the camera; and the director is free to make any camera setup on the foreground action—the background plate can be shot later and made to fit.

Many separate foregrounds may be added to an original background by consecutive exposures onto the same film stock, thus retaining the same quality throughout without extra duplicating.

color. This printed the toned positive image upon the film in the camera, while the complementary colored light reflected from the actors passed through the toned image as if it did not exist. The Dunning Process is probably the best remembered of these systems.

Back Projection

The Back Projection Process has always been the reliable stand-by. It is simple in conception: a print of the background scene is projected on to a translucent screen placed behind the foreground action staged in the studio. It has the advantage that the director can see the background scene in relation to the foreground action while it is taking place, and the composite scene is ready with the rushes the next day.

Flexibility of Traveling Matte

Traveling Matte is often quoted as an alternative to Back Projection, and, though its scope is much wider, this is indeed one of its functions, and there are many advantages in using it for this purpose, e.g.:—

1. The foreground of a traveling matte composite scene is equal in quality to the background, which may be pin sharp or out of focus as required.
2. The background may be changed many times after the action is shot.
3. The elimination of projection throw allows a considerable saving in stage space.
4. No time on the set is spent in rewinding film and lining up the background plate.
5. The director, when lining up on the stage, is not limited to the angle and perspective of the plate, as this can always be shot later to fit the foreground; furthermore, there is no restriction on the degree of tilt of the camera.
6. The cameraman need not spend time balancing the light intensity between screen and artist, as this will be done later in the laboratory.
7. The scale of the foreground is limited only by the size of the stage and focal length of the camera lens.
8. The plate may be shot at any time before or after the foreground, so studio schedules need not be upset if a background plate is difficult to get.

Definition of Traveling Matte

Traveling Matte is a system of making composite motion pictures, as previously stated, in which the foreground and background scenes are combined into one single image by using a "matte," i.e., an

Continued on Page 684

TYPICAL COMPOSITE shot achieved by traveling matte process for the German production "Judge of Juveniles." Shot was made in the studio; the foreground set was small, while the background of the distant street below was a separate shot combined in the compositing process described by author.

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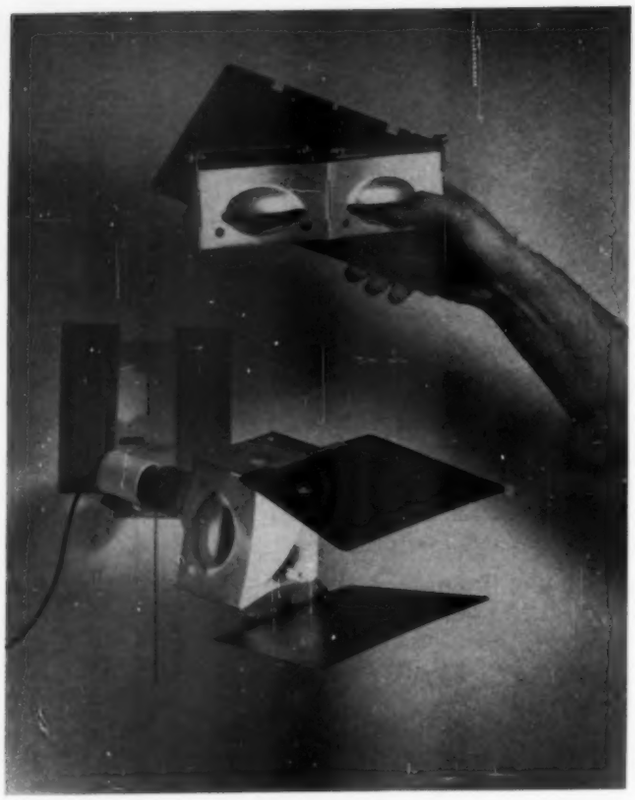

NEW LOWEL-LIGHT Barndoor compactly folded for easy storage (top of photo) and mounted and in operation (below). Barndoor may be readily mounted without aid of tools on all R-40 reflector-type bulbs, from 150- to 500-watts.

Barn Doors For R-40 Lamps

New professional accessory affords efficient light control with reflector flood lamps.

By JOSEPH HENRY

No one knows how long ago it was that some enterprising studio electrician hit upon the idea of mounting two adjustable flaps on a set lamp to control the light beam. Soon after, someone dubbed the gadget "barn doors"—a reasonable monicker. Today, the barn door is an important accessory in the art of lighting for motion pictures. Barn doors are chiefly used to cut off light reaching the camera from a set lamp; to provide certain light-and-shadow effects—in short to *control* the beam of light issuing from a lamp.

The barn doors, which are mounted on the front of the lamp, convert the circular pattern of its light beam into a different pattern, as the situation requires, with the beam now having two sharp straight edges, or compressed to a narrow rectangle of light. Since barn doors may be rotated a full 360°, the angle of the pattern is completely within the cameraman's control.

A common use of the barn door is to darken the upper portion of a set wall. Since most lighting units are placed quite high, the upper wall area is usually brightest. By rotating the barn doors so that the flaps are at the top and bottom of the lamp, the top flap may be lowered to intersect the top of the light beam so that a diagonal shadow will appear across the top of the background or wall of the set. Where a soft line of demarcation is required between the light and shadow area, a piece of diffusing material such as spun glass can be clipped to the edge of the barn door flap.

An important use for barn doors is on lamps used for back-lighting. Because such lamps are invariably placed high above the set, some of their illumination will strike the camera lens unless controlled by barn doors.

Barn Doors For Reflector Floods

With the increasing use of reflector flood lamps for motion picture lighting, a need has developed for a simple barn door for these lamps. Recently, Lowel-Light Engineering, whose unique Lowel-Light unit was announced in our January, 1960, issue, announced an efficient barn door for reflector bulbs trade-named the Lowel-Light Barndoor. (Ed. Note: The switch to the singular here is grammatical license; the accessory, having two doors or "flaps," is essentially plural).

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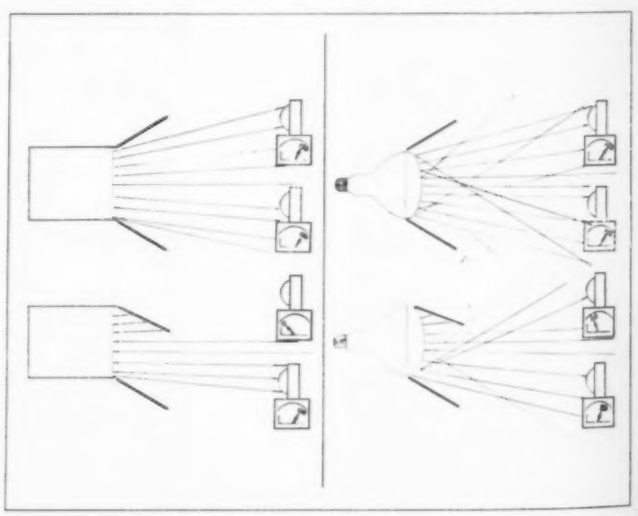
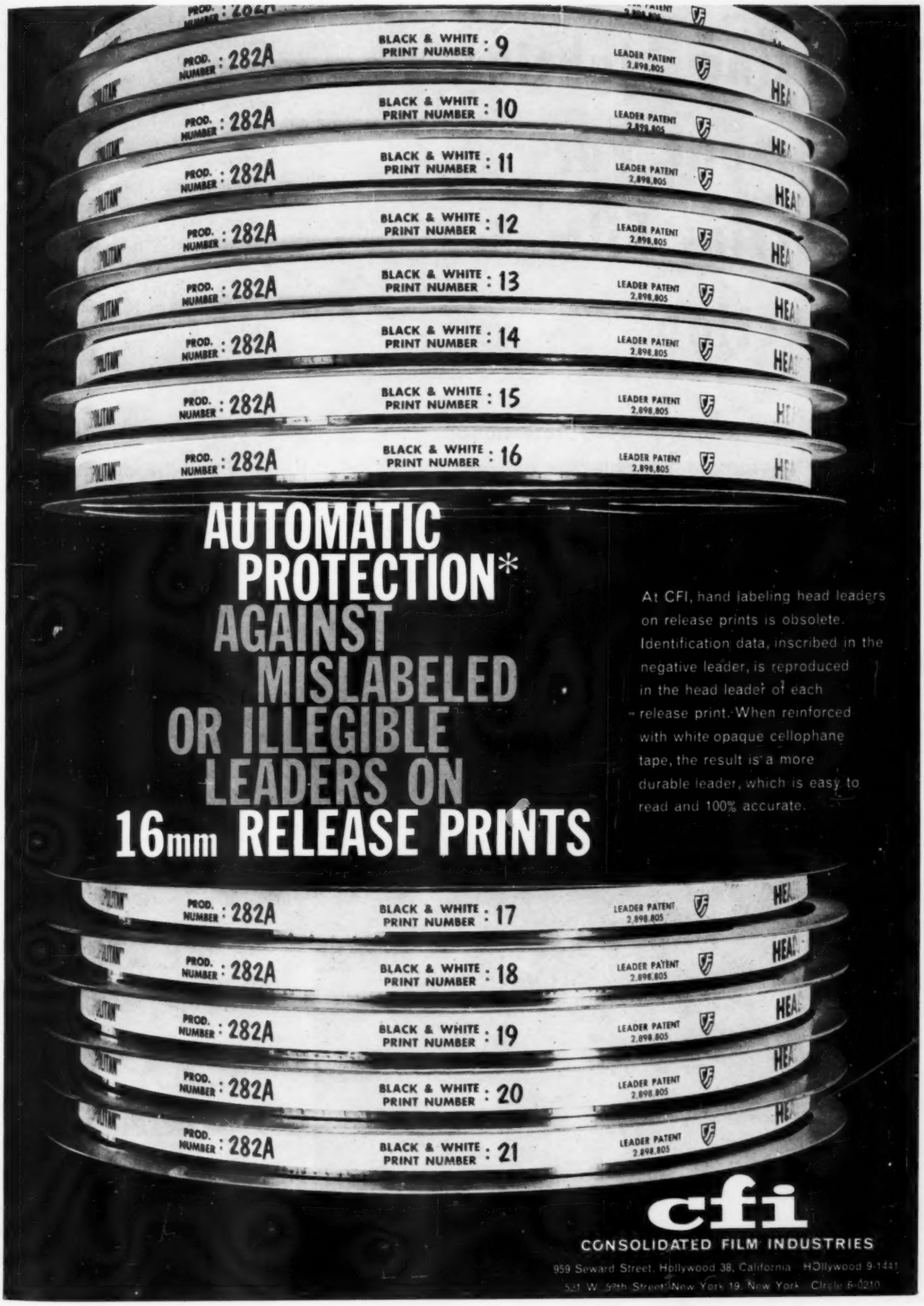


DIAGRAMS show comparative effectiveness of Barndoors when mounted on conventional spotlight (left) and on R-40 lamps (right). Spotlight, with Fresnel lens, emits basically parallel rays. The R-40 reflector flood lamp emits non-parallel rays. Note difference in meter readings (approximated only for illustration) when Barndoors are used. The same phenomenon accounts for the variation in shadow characteristics between the two sources.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Selecting Lighting Equipment For Industrial Film Production

A brief description of qualified professional set lighting equipment suitable for average in-plant motion picture production.

By DARRIN SCOT

BECAUSE MOST FACTORY interiors are more difficult to light for motion picture photography than the average studio set, it is important that the in-plant photographic department acquire basic lighting equipment best suited to lighting average industrial interiors — lamps that are light in weight, readily portable, and that will produce adequate photographic illumination. (Aerojet-General Photo.)

THE SELECTION of adequate and proper lighting equipment for the production of commercial and industrial films is a problem of major importance, not only to the professional producer newly entering this specialized field of production, but also to technicians charged with setting up an in-plant film unit.

Business film production has its own peculiar requirements as far as lighting equipment is concerned, largely because it often demands that scenes be filmed on location or under less than ideal conditions. The two questions usually to be answered before anything is requisitioned are: "*How much* equipment will be needed to form a basic lighting unit?" and "*What types* of lighting equipment will best do the job?"

We speak of a *basic lighting unit* collectively to mean the minimum number of pieces required to adequately light most subject matter likely to be scheduled for filming. There is, of course, no fool-proof way to foretell the many different types of cinematic situations which may arise in the course of a production, but by and large, commercial and industrial filming breaks down into four main categories: (a) Product identification closeups, (b) Manufacturing sequences in plants or factories, (c) Scenes of executives or other personnel shown in offices or display rooms, and (d) Location interiors of all types.

We are, at this point, purposely disregarding lavish dramatic sequences, such as when the history of an organization is to be re-enacted on a sweeping scale. Such sequences, usually included in only the most highly-budgeted business films, invariably require complicated studio set-ups and elaborate lighting facilities. The producer's logical procedure, then, is to acquire the *basic* lighting units, and add the more elaborate pieces of equipment as the need for them arises.

Product Identification Closeup

The following items of illumination equipment are recommended for lighting products or a detailed action operation in closeup:

1—*2000-watt Junior Spotlight:* This lamp produces a sharp single-source keylight, bright enough to allow the lens to be stopped down for adequate depth of field. When shooting closeups with a normal or longer than normal lens wide open, the depth of field is

characteristically limited. Hence the need for a keylight strong enough to permit stopping down to obtain increased depth of field so that every plane of the subject is in sharp focus.

3—*750-watt Spotlights:* These serve as fill lights, rim-lights and backlights. Flooded out and softened with slight diffusion, these units provide an even fill light. Focused down to a concentrated beam they can be used to sharply outline the subject and provide clear separation of subject and background.

2—*300-watt Incandescent Spotlights and the smaller Dinky-Inkies:* These are used as *kick* lights for highlighting or accenting a small area of a subject. They are especially valuable in photographing small objects because they permit more precise control of the light than larger units.

In general use, the above units should be equipped with barn-doors and diffusers to further facilitate control of the light.

Manufacturing Sequences In Factories

Where such processes can be filmed in a breakdown of separate scenes fall into what might be loosely called the "medium long shot" category, the following units (in addition to those described above) should prove adequate:

2—*5000-watt Senior Spotlights* equipped with barndoors and diffusers. These lamps are powerful enough to produce a sharply defined single-source keylight for a fairly large area.

2—*2000-watt Cone-lites.* These are relatively strong diffused light sources valuable as fill lights for fairly large areas; or an alternative would be:

4—*1000-watt Cinelites.* These lamps are lightweight, ruggedly constructed units having parabolic reflectors that take a 1000-watt mogul-base flood lamp.

Most business films include scenes of executive personnel shown at work in their offices. When one man is seated at a desk there is not much of a lighting problem. But when two or more people are included in the scene, then the lighting demands are more complicated. To be on the safe side, when filming scenes of this scope, supplement the units already mentioned with the following additional units:

1—*10,000-watt Spotlight* to be used as a single-source keylight.

2—*5,000-watt Cone-lites,* for fill illumination over a wide area.

5—*2,000-watt Junior Spotlights,* to serve as backlights, rim-lights, etc.

4—*750-watt Spotlights,* to function as kickers; to point up small but important details; to serve as eyelights, etc.

Accessory equipment should include a set of barndoors for each spotlight,

Continued on Page 703

PERFORMANCE CHART OF LAMPS BOOSTED WITH COLORTRAN or SIMILAR CONVERTERS

Lamp.	Voltage Position	Input Current (Amps)		Intensity and coverage at 10 Ft.		Intensity and coverage at 20 Ft.		Application
		220 Volt Input	120 Volt Input	Intensity (Ft. Candles)	Approx. Coverage	Intensity (Ft. Candles)	Approx. Coverage	
PAR 64 500 Watt Wide Flood	120 160 185	2.5 4.0 4.9	4.7 7.4 9.1	115 300 450	4 Ft. x 5 Ft.	20 63 108	8 Ft. x 14½ Ft.	"Key" light equal to a 5000 Watt studio light at wide flood. Use in CineKing light.
PAR 64 500 Watt Medium Flood	120 160 185	2.5 4.0 4.9	4.7 7.4 9.1	370 870 1400	2 Ft. x 4½ Ft.	90 240 360	4 Ft. x 7½ Ft.	"Key" light equal to 5000 Watt studio light at medium flood. Use in CineKing light.
PAR 64 500 Watt Narrow Spot	120 160 185	2.5 4.0 4.9	4.7 7.4 9.1	1200 2720 3750	1½ Ft. x 2 Ft.	330 810 1200	2½ Ft. x 4 Ft.	Spot light stronger than a 5000 Watt studio light at spot. Use in CineKing light.
PAR 56 300 Watt Wide Flood	120 160 185	1.4 2.2 2.8	2.6 4.2 5.1	90 230 350	3 Ft. x 7 Ft.	22 67 85	6 Ft. x 14 Ft.	"Key" light. Use in CineKing light.
PAR 56 300 Watt Medium Flood	120 160 185	1.4 2.2 2.8	2.6 4.2 5.1	242 620 915	1½ Ft. x 3½ Ft.	50 170 250	3½ Ft. x 7½ Ft.	"Key" light. Use in CineKing light.
PAR 56 300 Watt Narrow Spot	120 160 185	1.4 2.2 2.8	2.6 4.2 5.1	880 2050 2950	1½ Ft. x 1½ Ft.	225 560 840	2 Ft. x 4 Ft.	"Key" light. Use in CineKing light.
PAR 38 150 Watt Flood	120 160 185	:7 1.1 1.4	1.3 2.1 2.5	37 93 150	5 Ft. x 5½ Ft.	8½ 24 38	10 Ft. x 11 Ft.	"Key" light in clusters. Single "Clamp-on" light.
PAR 38 150 Watt Spot	120 160 185	.7 1.1 1.4	1.3 2.1 2.5	50 150 260	18 Inch Diameter	15 38 65	24 Inch Diameter	Spot for "Kicker" or for long range "Clamp-on."
R-60 1000 Watt Flood	120 160 185	4.7 7.4 9.1	8.7 13.7 16.7	166 345 490	7 Ft. Dia.	42 86 122	14 Ft. Dia.	Smooth, even fill light gives effect of a cone light. Use in Super Kicker.
R-60 750 Watt Flood	120 160 185	3.4 5.6 6.6	6.2 10.0 12.1	145 335 490	5 Ft. x 6 Ft.	36 84 122	10 Ft. x 12 Ft.	Smooth, even fill light. Use in Super Kicker light.
R-60 500 Watt Flood	120 160 185	2.5 4.0 4.9	4.7 7.4 9.1	100 245 370	4 Ft. x 6 Ft.	25 61 92	8 Ft. x 12 Ft.	Smooth, even fill light. Use in Super Kicker light.
R-40 500 Watt Flood	120 160 185	2.5 4.0 4.9	4.7 7.4 9.1	34 82 125	10 Ft. Dia.	8.5 21 31	20 Ft. Dia.	Smooth, even fill light. Use in Kicker light.

ABOVE CHART SHOWS the volume of light in foot candles and area of coverage of most of the incandescent lamps used with various step-up voltage converters. When such lamps are fed with 160 volts, color temperature of the illumination is 3200° Kelvin; at 185 volts, 3400° Kelvin. The coverage area shown for each lamp is based on a 50% fall-off in intensity of the illumination. Chart, compiled by Natural Lighting Corp., is reproduced from American Cinematographer Manual.

8mm Sound film

. . . where does it go from here?

By JOHN FORBES

IN THIS FOLLOW-UP to our initial article on the subject of 8mm sound motion pictures in the September issue, we had hoped to bring readers factual reports about users of 8mm sound in industry, science and research—that is, reports of instances where filming in these fields was actually done with 8mm sound or silent cameras instead of with 16mm or 35mm and subsequently reduced to 8mm. There is a tremendous potential for 8mm sound movies in the three fields named above, but most of those who have given any substantial thought to the idea are already using 16mm—have 16mm cameras, projectors and recording equipment. The difference in money saved, using 8mm, is so small, they point out, as not to justify a switch from 16mm to 8mm—at least for the present.

In short, there is very little factual information on 8mm industrial films as yet. There has been much talk and speculation but very little action. The Industrial Products Division of Fairchild Camera and Instrument Company, which is marketing an 8mm single-system (magnetic) camera trade-named Cinephonic-8, reports that this camera and its companion 8mm sound projector are still in the industrial testing stage. There are a number of companies and organizations that are presently using this equipment to determine if it is practical and useful in their scheme of operations.

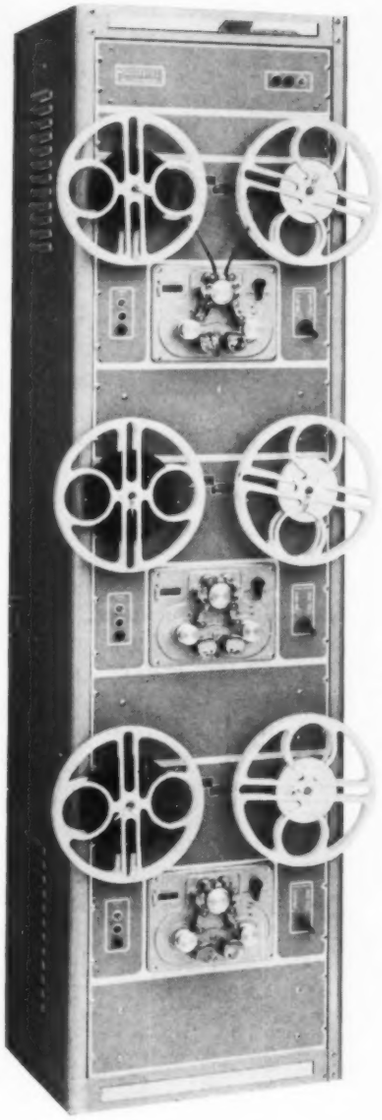
The uses to which the Cinephonic-8 cameras and projectors are presently being put, Fairchild reports, are: recording of company board meetings; training and dance instruction; and police activities. In the educational field, language films and institutional documentaries are being made by colleges and institutions themselves for future presentation, should general utilization of 8mm films become a trend.

In our previous article we told how Calvin Productions Corporation, of Kansas City, Missouri, pioneered with 8mm sound in 1952, and introduced its Movie-Sound-8 projector, of which about 1,200 machines were marketed. As to the earliest known actual industrial use of 8mm sound films, Calvin reveals that in 1954 the company made several 8mm sample prints for Caterpillar Tractor Company, which were reductions from 16mm. The 8mm prints were sound-striped and recorded by Calvin — intended for use with the Company's Movie-Sound-8. While these films did not result in any great use, they are believed to be the first industrial 8mm sound prints that were made.

"About every industrial customer we have has, at one time or another, asked us about 8mm prints," said Calvin's Vice-President William D. Hedden. "However, no one has yet actually been serious enough to be definite about his interest."

That Calvin, along with other film laboratories, strongly believes there's a future for volume production of 8mm prints is evident in the fact the company

Continued on Page 680



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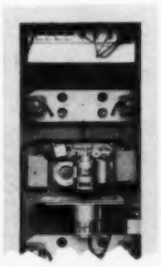

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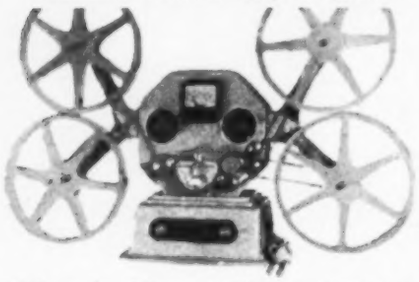

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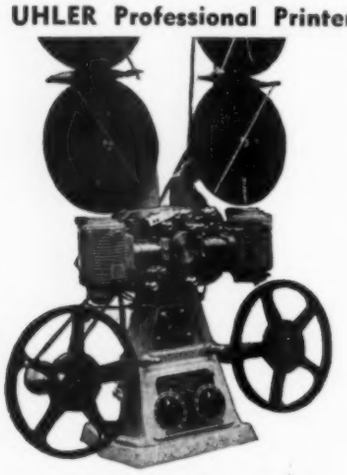

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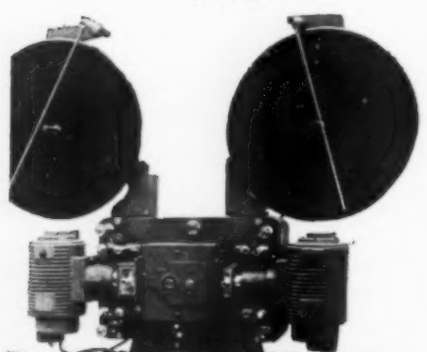

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8MM SOUND FILM

Continued from Page 678

is just completing the construction of its own 16mm-to-8mm reduction printer.

"It has been tested, shown remarkable results, and soon will be ready for production use," Hedden said. "Because we have not been able to offer more than experimental scale printing of 16mm-to-8mm until now, we have not pushed this service. The next six months will be a different story; since the advent of 8mm sound projectors last spring, we have been working hard on the industrial market."

Future For 8mm Is Definite

The greatest optimism for the future of 8mm sound films, perhaps is evidenced by Eastman Kodak Company, which is already marketing an excellent 8mm magnetic sound projector. "It's a safe bet," this company says, "that if you're involved in any way with the production and use of motion pictures, you'll soon be involved in 8mm sound." Eastman Kodak believes that 8mm sound, far from being a fad or an innovation simply for home movie makers, offers opportunities for extending the use of motion pictures into areas where they have never been practical or possible before.

More recently the belief has been expressed that 8mm sound motion pictures might very well become a potent weapon for this government in fighting the spread of Communist ideologies in the Latin Americas and in other countries—bringing the real truth in pictures and sound to the people there who are already under pressure of Red propaganda.

Lower cost, as Eastman Kodak Company points out, is the first advantage that comes to mind in the use of 8mm sound. And lower cost extends to the whole 8mm system — cameras, film stock, prints, distribution, and projectors. Equipment is both smaller and easier to use, and the quality of 8mm sound is quite good.

Sound 8, of course, is not a panacea. There are some things it won't do. For one thing, it has limitations in sharpness and image brightness so that its biggest success will be in the area of small audiences. But, as Eastman Kodak points out, 8mm sound can *supplement* a 16mm sound program; where organizations are particularly interested in audiences of 50 people or less, 8mm may be a good choice.

Not only is 8mm equipment lower in cost than 16mm, but 8mm color prints are decidely more economical than 16mm. A thousand 16mm color prints of a 10-minute film can be purchased for $20,000. At this time, the same number of 8mm prints may cost only $15,000. And when laboratories have developed new techniques for high-speed gang printing of 8mm film, it is not inconceivable that a thousand 8mm prints might cost only $6,000.

On the subject of 8mm print production, General Film Laboratories, of Hollywood and Kansas City, in the September issue of its publication REWIND, devoted considerable space. General believes that the potential uses for 8mm sound are many and interesting and that the potential market is big. "We plan to be one laboratory servicing this market," they say. The paragraphs that follow are excerpted from the REWIND article:

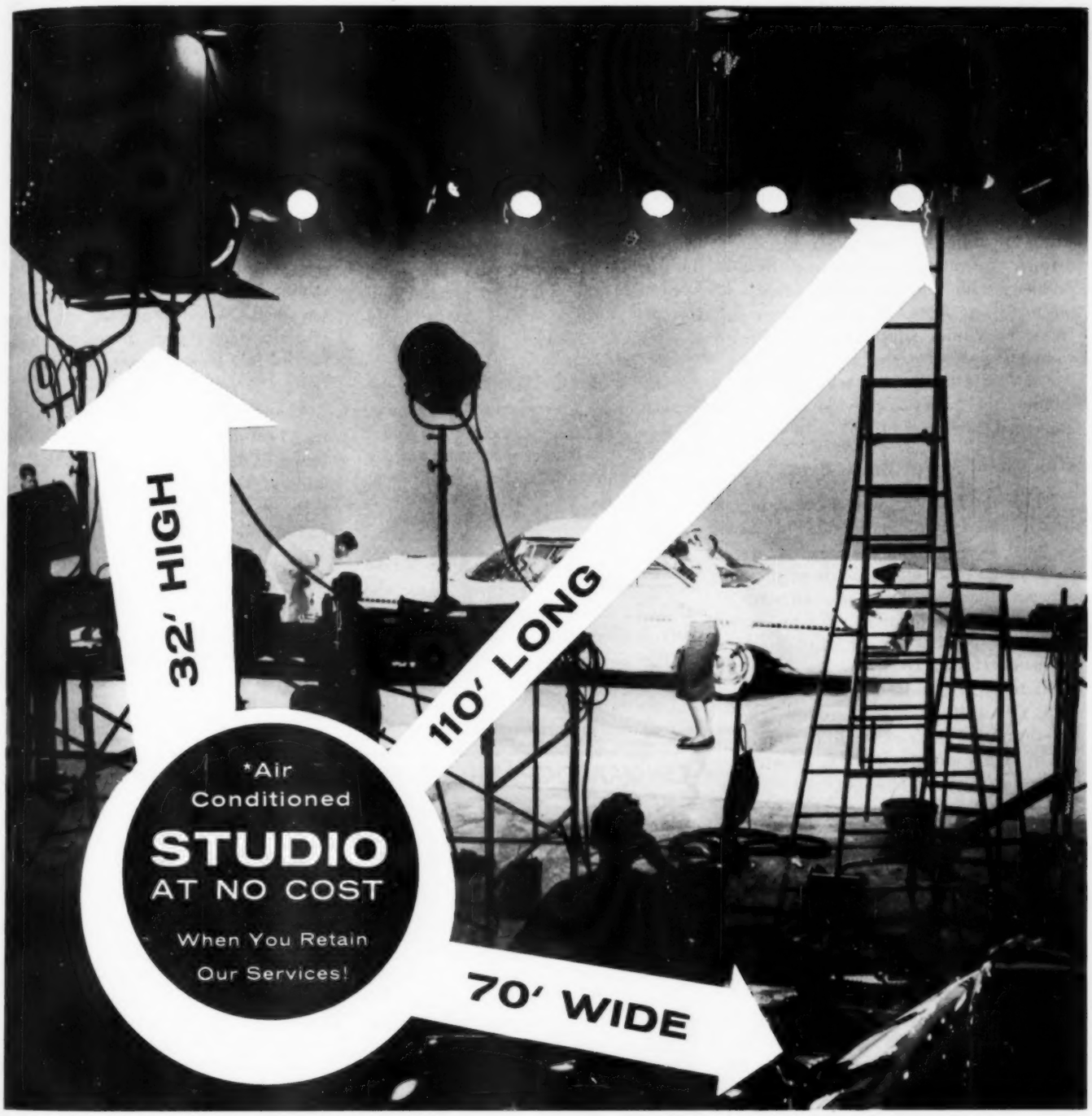
"First, we should separate production and print duplication in our thinking. No one is boosting 8mm for professional camera work. All agree that production wil continue on 16mm and 35mm, with some possibly on television tape or other original image recording materials and systems, the prints then to be made on 8mm for certain markets, on 16mm or 35mm for others.

How 8mm Will Be Shot

"Certainly, we may expect 8mm cameras to be used to make photographic records, as 8mm is already being used — with the original camera film then projected. This provides an inexpensive and satisfactory way to record certain engineering tests, product performance checks, situation records, personal performance ratings, etc.

"But, if *prints* are to be made, the scenes will be shot on other materials.

"We at General Film feel that 8mm provides a sound print that will revolutionize the present distribution, sales, and utilization of photographic motion picture prints—broadening and extending the print sale base, rather than taking present markets away from 16mm or 35mm. We are acting on this belief by engineering and installing our own equipment for rapid, multiple-duplication of 8mm release prints—utilizing our basic 35/32mm printing system (with which we now produce two improved quality 16mm release positive prints) and adopting the sys-



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tem so that we can print *four* 8mm prints, side by side—in addition to maintaining our present printing of *two* 16mm prints per strip.

"We are utilizing a 35mm width positive duplicating stock perforated for four 8mm side-by-side prints. Our magnetic striping system has for some time been utilized to place, simultaneously, up to six magnetic stripes on a width of film, so this phase of the striping operation presents no new problems. Our film slitters are adaptable to slitting 8mm, as well as 16mm, from the 35mm width. And we are completing sound recording batteries to 1) re-record multiple tracks and 2) monitor the tracks to provide immediate sound track inspection.

How Good Is An 8mm Print?

"This might be answered by saying 'much better than is expected, but not as good as we'd like.' In fairness, we must judge 8mm on the basis of small screen, limited audience use. In some very favorable situations, the picture and sound do well for a medium-large audience (50 to 100), but its quality limitations fit it to the small audience (the 20 to 40 of a class room), the small group (the 5 to 15 of a committee or club), and the individual viewer (sales prospect, student, etc.).

"Under reasonably favorable projection conditions, the 8mm picture is acceptable up to a four foot width screen, but preferably a smaller size. The picture is not as sharp as 16mm photo reproduction. The first-time projectionist has a tendency to keep refocusing, trying to find a screen sharpness that doesn't exist. Today's 8mm picture quality may be compared to the 16mm picture quality of the early or middle 1940's. Some loss in definition is the exchange made for a reduced print cost—but this may well be improved.

"The sound reproduction is limited by the width of the stripe (20 mil for the Eastman Kodak 8mm magnetic sound projector), the professional quality of the re-recording equipment in the laboratory, the film movement and sound amplification in the projector, and the conditions of sound projection —including whether the 8mm projector's built-in speaker is utilized, or a separate and better quality speaker. However, the sound reproduction more than matches picture projection, and should arouse no audience criticism, of itself. Most first-time audiences are surprised and pleased by the sound quality.

"In business and industry, the thinking trends to more prints for the same budget, and larger budgets for many more prints.

"Some firms have been using silent 8mm prints with explanatory titles in dealer training, machine demonstrations, new model introductions, etc.—in print orders not only up in the hundreds, but up into the thousands. Even though a sound 8mm print will cost more than a silent 8mm print, we expect an expanding market in this type of film use.

"Just how big and how close the 8mm sound market may be remains to be seen. We think it will be very big, and that it's waiting for the laboratory to realize the quality and price potential in 8mm."

Conclusion

The 8mm sound film situation is best summarized by repeating here the statement from Eastman Kodak Company, quoted earlier:

"It's a safe bet that if you're involved in any way with the production and use of motion pictures, you'll soon be involved in 8mm sound." ■

BARN DOORS

Continued from Page 674

Lowel-Light has avoided mounting its barn door unit to the lamp socket. Instead it snaps over the rim of the lamp and is held in close contact with it by friction, at the same time permitting a full 380° rotation of the unit. A flexible folding design of the housing permits the barn door unit to be mounted or removed from a lamp without tools. When removed, the whole unit folds flat and actually can be carried in a jacket pocket. (See illustration).

Constructed entirely of aluminum for its heat-dissipating properties, the Lowel-Light Barndoor weighs but 4½ ounces. The door flaps are so hinged that they may be swung back flat against the bulb, allowing the necessary space at the top when barn doors are used on back lights.

One of the most important features of the unit, perhaps, is the finish of the flaps; they are anodized black instead of painted or lacquered. Thus, the finish wil never chip or scrape off. The remainder of the unit—the housing or

CINEMATOGRAPHER'S MANUAL DEBUTS THIS MONTH

AS WE GO TO PRESS, an intense, bespectacled author paces the floor of an adjoining office as though awaiting arrival of the stork. He is Joseph V. Mascelli, who only a few days ago put the last form of the 400-odd page American Cinematographer Manual "to bed" at the press, and anxiously awaits the first bound copies of his handiwork.

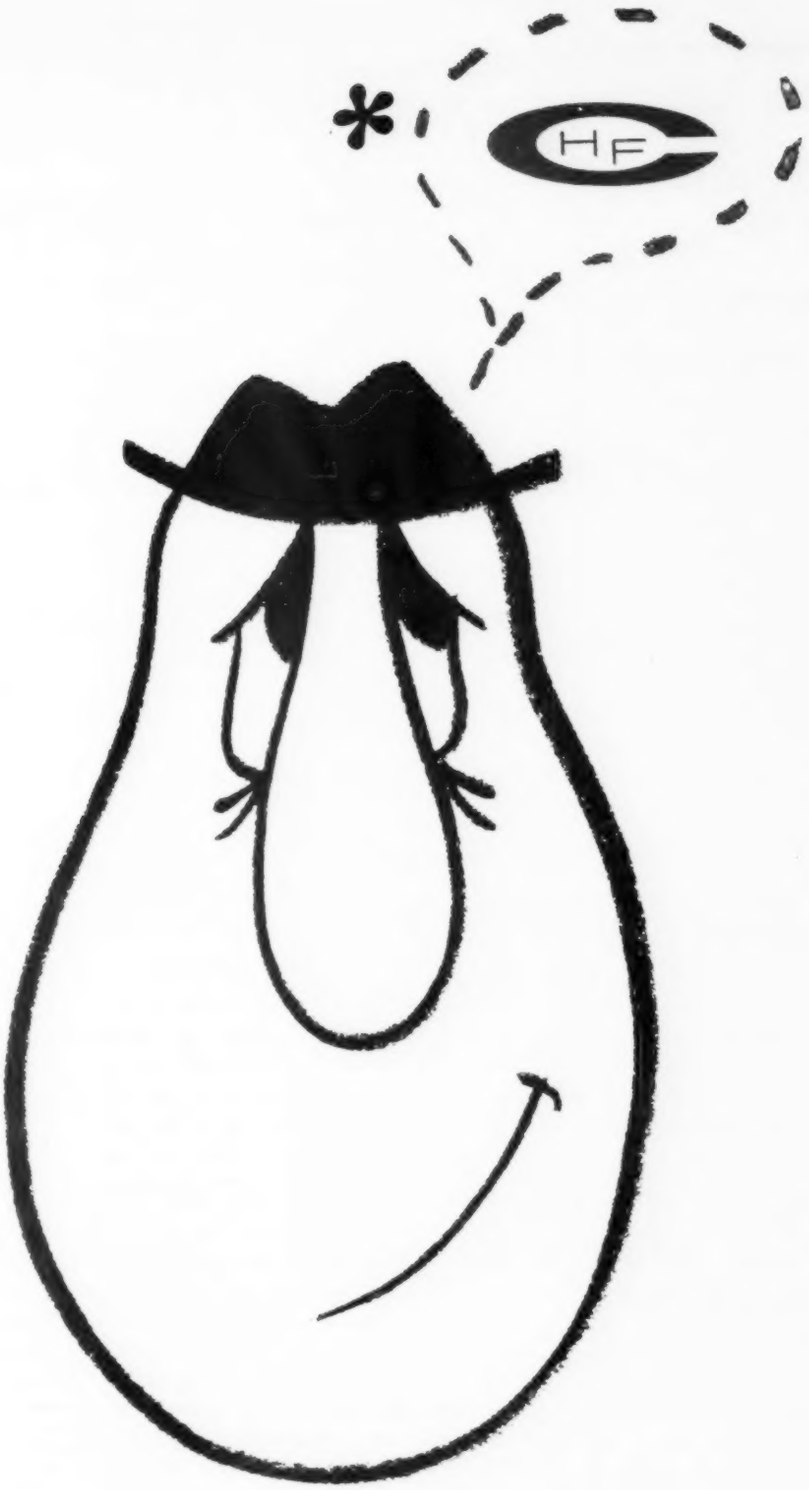
JOE MASCELLI

When the American Society of Cinematographers sometime ago decided to publish a completely new handbook of motion picture photography and production techniques, it chose Joe Mascelli as its editor. He previously had authored a number of articles which were published in *American Cinematographer*.

Following an extensive period of research, Mascelli spent a full year compiling, checking and re-checking accumulated facts and data, and preparing this material for the press with the helpful guidance of Arthur Miller and Walter Strenge of the ASC's Publications Committee.

A free-lance cinematographer and author of numerous technical and semi-technical articles on cinematography and motion picture production techniques, Mascelli has a background of more than 20 years photographic experience in military, industrial, documentary and TV motion picture production, during which time he amassed a staggering fund of knowledge which he tucked away in his mental filing system. This trick paid off handsomely when it came to compiling text, charts, etc., for the Manual.

The American Cinematographer Manual is the result of a need long felt to provide professional cinematographers and others engaged in the production of motion pictures with a reliable, authenticated source of technical reference data. Few cinematographers are capable of memorizing every fact and formula necessary to his work. Thus, this source of factual information, fully up to date, and readily accessible through simplified indexing has been compiled to assist cameramen in all fields of motion picture production. ■



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The Lowel-Light Barndoor is designed for use with all R-40 reflector bulbs. Although originally designed for use with the Lowel-Light tape-up, clamp-on lighting unit, it works equally well with all other portable lighting units designed for R-40 reflector bulbs. The unit retails for $5.75 at dealers. ▪

TRAVELING MATTE PROCESSES

Continued from Page 671

opaque silhouette of the foreground image, which is used during printing to mask that portion of the background image which it is intended to replace by the foreground image. A "traveling matte" is a series of such mattes on a strip of film, each individual matte image corresponding to one image on the foreground film. Very many methods have been used to create a matte. One used in the past was to project the foreground image and make a silhouette drawing of each frame, and, although tedious and costly, it was found to be very useful for the occasional effect sequence.

The "Blue Backing" Process

For over twenty years a system has been widely used, mostly for color films, in which the foreground scenes are shot against a backing of such a color that it will expose one of the layers of the color negative to the exclusion of the others. Any layer may be selected, but blue has most often been used. Thus the blue separation positive and the red separation negative have a clear base, the backing having been fully exposed on the blue layer, and hardly at all on the red layer. When these two pieces of film are placed together in bi-pack we have a negative plus a positive on a clear base, sufficiently good material from which to print (1) a negative in which the background is opaque and the foreground is clear (as frame B in the diagram), and (2) a positive matte in which the foreground is a silhouette against a clear background (as frame E in the diagram).

This works quite well, except that any part of the foreground scene that has a preponderance of blue will be represented by clear film on both color separation films, and that area will appear on the composite as a hole in the foreground scene. The mattes serve as masks, the background shot and the foreground action being double-printed on a single film through the positive and negative mattes respectively. (In the diagram as if Frame D had a clear base, so it would be necessary for it to be exposed in bi-pack with Frame B, thus cutting out the smoke from the pipe.)

This system has been well proved in practice, but it has some limitations:—as just mentioned, the background color must not be present in the foreground (if a blue backing is used, then a girl wearing a blue sash might appear to be walking around in two halves): because the separate negative matte covers them, glass windows just disappear, and the same negative matte is liable to cause all kinds of odd effects on smoke, fine mesh curtains, drinking glasses and similar objects.

Need for Complimentary Lighting in an Improved System

A fundamental requisite of an improved process is the use of a lighting system of complementary colors for the foreground and the backing; i.e., lighting in such a manner that the effective rays from the foreground reaching the film have no light rays of the same wavelength as those received from the backing. The foreground film will then carry its own integral matte, showing a complete image, including transparent, transluscent and fine details such as reflections in glass windows, smoke and fine hairs (See frames A and D in illustration). These are not recorded by the positive matte (Frame E), and are thus double-printed on to the background, rendering a natural and pleasing picture (Frame G). The matte film is insensitive to the foreground lighting, so it will not record any of the light reflected from the foreground scene whatever the color or tonal range, and will thus produce an efficient matte (Frames B and E).

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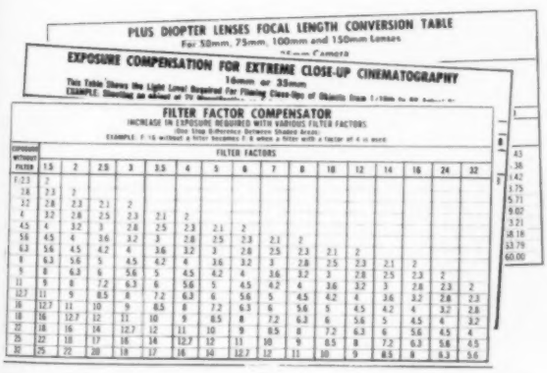
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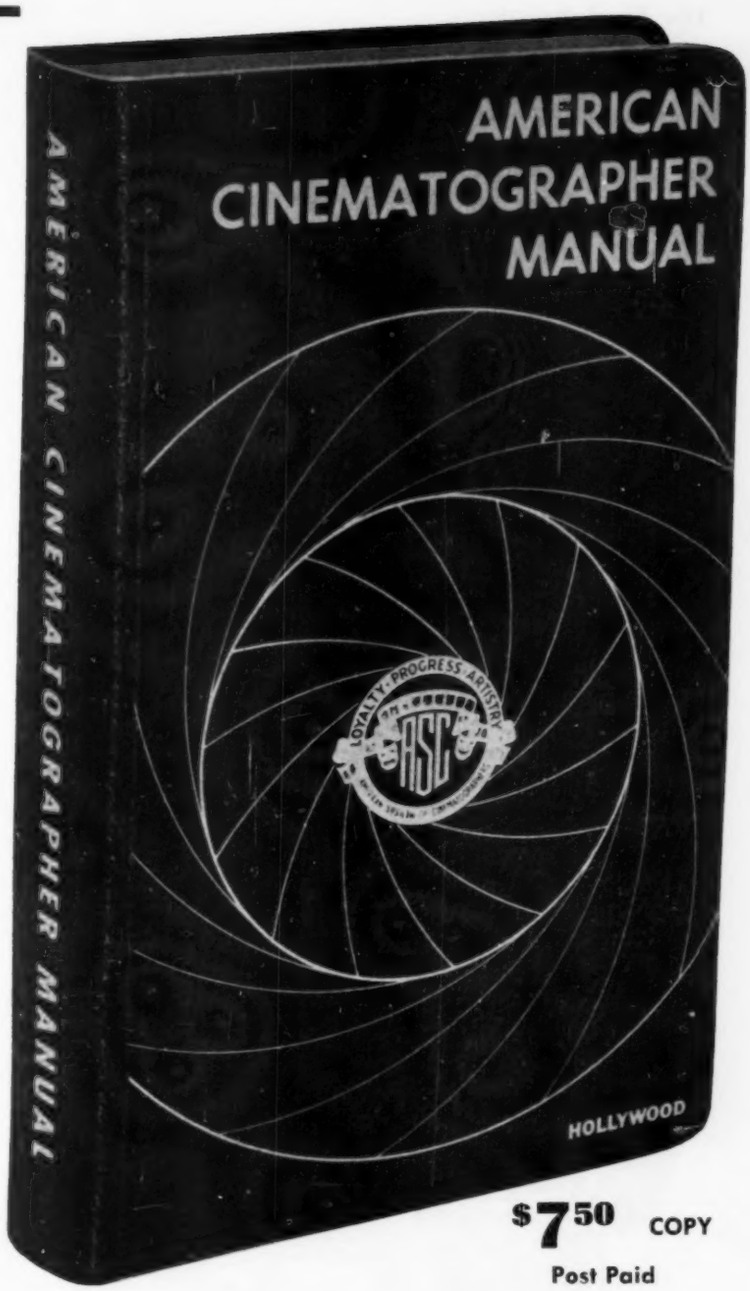

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The Final Solution

This is comparatively simple with black-and-white traveling matte, but the problem has been to do it in color without upsetting the color quality of the foreground picture. Invisible light, in the form of ultraviolet and infrared, has been tried with a certain amount of success, but this brings up the problem of correcting the distortion of matte image size produced by the great difference between the focal plane of these wave bands and that of white light. The Rank Process solves the problem by the use of monochromatic yellow light, which is found in the spectrum between red and green. If it is filtered from the foreground lighting, no discernible change takes place in the color of the scene as photographed and, being well within the visible spectrum, there is no problem of matte image size. The Rank Black-and-White Process makes use of the complementary colors blue and yellow.

Production of Foreground and Background Component Images

The only essential material required to make a composite scene is, as we have seen, a positive of the *background* scene and the two positive films of the *foreground* scene. The former is a straight photograph and presents few special problems, so for the moment we may deal with the two foreground films only. These two films are required to present photographically opposite aspects of the same scene, yet they must be geometrically the same. Experiments were once made by producing the picture and matte images alternately, but the time lag mostly resulted in a line around the foreground artist. Our original experiments were made using an ordinary steady production camera, loaded with bi-pack film, but this resulted in flare and loss of definition.

A Beam-Splitting Method Essential

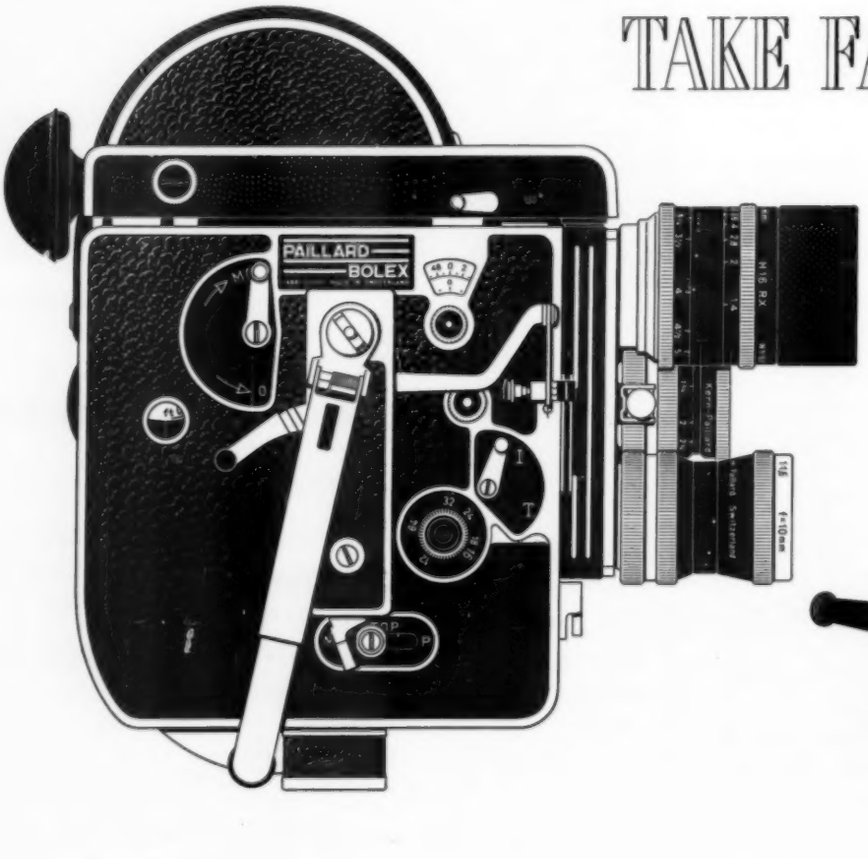
It was soon realized that the two images must be produced simultaneously and in the same optical plane, and to do this a beam-splitting camera would be needed. This type of camera has two gates set at right angles, each of which is able to receive a geometrically identical image from the same lens using a semi-transparent mirror set between them. This method allows plenty of latitude in dealing with the films separately in respect of balance of exposure and light filtering. One gate is loaded with panchromatic film, and the other with blue sensitive film. The light passing from the lens to the panchromatic film is filtered, so that only yellow (i.e., minus blue) light reaches the film, making it virtually yellow sensitive only, while the film in the other gate responds to blue only.

Operational Method

The foreground subject is placed in front of a plain blue-illuminated backing, and the subject itself is lit with light which has passed through a yellow filter, corresponding in color to the camera filter which makes the panchromatic film yellow sensitive only. The blue backing is lit in such a way that the light reflected from it is even in intensity, and is complementary in color to the yellow foreground lighting.

The scene is shot with the beam-splitting camera just described, so that panchromatic film records the yellow foreground only, producing a negative picture with a clear base (A in flow diagram), and the blue sensitive film records the blue backing only, producing a negative matte, i.e., a dense base with a clear portion to the shape of the foreground image (B). Positive prints

TAKE FADES...LAPS...



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are made, from the foreground negative (A to D) from the background negative (C to F), and from the matte negative (B to E). This must be done on a reliable registration step printer, as picture steadiness is of utmost importance at every stage of the process. Positives D and F are made on fine grain duplicating film and positive E is made on high contrast film.

The Single Strip B&W Process

The Single Strip Traveling Matte Process is an alternative black-and-white system. While suitable for most purposes, it is especially recommended for television films.

The foreground set-up is similar to that of the beam-splitter process, but a beam splitting camera is not necessary —any steady Mitchell or Newall camera can be used. The scene is shot with Eastman Color Negative, which is developed normally. From the resulting color negative the laboratory is able to produce, by means of color separation, the foreground positive D and the matte E. The production of the composite from these components is virtually the same as for the beam-splitter process.

Because there is no need to hire a special camera and crew, and the laboratory work of producing the composite is simplified, this method is cheaper. It is also particularly good as to coincidence of matte and forground image. Tonal rendering is very good, but the use of color film tends to lower image definition.

The Rank Color Process

The color process differs from the black-and-white process mainly in the color of the light used. Because all the colors of the foreground must be correctly recorded, it is necessary to illuminate it with white light. Here advantage is taken of the fact that most yellow objects reflect very little monochromatic yellow, the yellow effect mostly coming from a mixture of red and green light. In fact integral tripack color negative is almost insensitive to the narrow monochromatic yellow band (found between green and red in the spectrum), and, although a slight change may be noticeable to the eye, removal of this narrow band has no discernible effect in the color of the scene as photographed.

Filters

The rare earth didymium, incorporated in glass, makes a satisfactory filter to remove the monochromatic yellow from the foreground lighting. Lamps covered by didymium filters emit a photographically white light composed of blue, green and red, although without monochromatic yellow.

The backing must reflect monochromatic yellow light only. This effect is obtained by illuminating a flat white backing with ordinary sodium lamps, as used in street lighting, which have a spectrum emission at 589 millimicrons.

The Beam-Splitter Color Camera

The beam-splitting camera differs from that used in the black-and-white process only in the optics. The beam divider relies on a 45 degree controlled interference filter pellicle, which is graded to transmit monochromatic yellow to the matte negative film (camera gate B in the diagram), and reflect the remainder of the visible light to the foreground film (camera gate A in diagram). The light reaching the matte film passes through a yellow filter, and the light to the color film passes through a didymium filter, thus perfecting the spectrum division initiated in the beam-divider.

The negative color film is balanced

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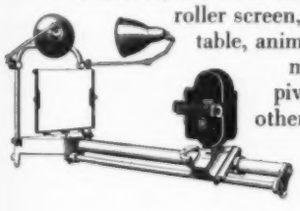

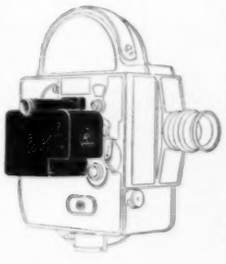

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for 3,200°K. In straighforward production shooting this color temperature is obtained by using unfiltered incandescent lamps, or white flame arcs with C.T.O. filters. In shooting Color Traveling Matte, the camera optical system and the didymium filters on the lamps lower the color temperature of the light reaching the film by about 2,000°K. This is corrected by filtering the source: instead of an orange filter, a light-yellow filter in the form of a Wratten 20-Y is sufficient to correct a white flame arc, which is thus very efficient; but on the other hand the incandescent lamp, previously without a filter, must now have a C.T. blue, thereby decreasing its efficiency. Arcs and "inkies" may thus be mixed when lighting the foreground, but arcs are more economical.

Production of the Composite Negative

The operation of producing the composite negative can be carried out on an ordinary optical printer. The background and foreground are exposed consecutively, dip tests being used as a guide to adjusting the position of matte and picture and the relative density of foreground and background scenes. The Rank Laboratories however, use a double headed printer which is designed especially to produce Traveling Matte Composites, thereby giving a quicker service, with more exact line-up and better balance between background and foreground scenes. Sometimes known as the Beam Combiner, it is optically the reverse of the beam-splitting camera. It has two projectors set at right angles, with a semi-transparent mirror between them which reflects and transmits the light, so that the camera receives the images superimposed. This combined image may be deflected so that the picture is projected on to a screen, enabling the position of matte to picture, and relative density of foreground and background scenes, to be adjusted visually. The whole combined scene may then be inspected while the machine is in motion, as it would be when actually exposing. This machine not only facilitates a quicker service but, control being more positive, background and foreground will usually be better matched.

Using the Specialized Printer

It will be seen from the diagram that positive prints are made from the foreground negative A, the matte negative B, and the background negative C, producing the desired components mentioned earlier (D, E and F). Components E and F are threaded into one gate of the beam combiner in bi-pack, and component D into the other. Background positive F is exposed through the matte E. This matte prevents exposure of the foreground areas by the printing light. At the same time the foreground positive D is exposed into that unexposed portion, the required background areas being protected from the printer light by the black background of the foreground positive D. The combined picture is adjusted visually, photographed, and after development we have a composite negative ready for cutting into the final picture.

Matching Inserts

It can be seen that the films depicting the foreground action, matte and background scene, are processed in step all the way, so the final composite negative is a first generation "dupe" both in foreground and background, tending to make the over-all quality the same, and helping the illusion as to the unity of the picture. Any other optical work in the same scenes, such as dissolves and superimpositions, can be incorporated at the same time without loss of quality.

Many separate foregrounds can be added to an original background by consecutive exposures on to the same film stock, thereby retaining the same quality throughout without extra duplicating. Briefly, each scene is printed through a combined matte of those scenes which are to overlay it, thus always leaving an unexposed area for printing in the next foreground scene which is nearer the camera. By juggling the mattes, actors photographed as separate foregrounds can walk before and behind each other as required, and it is even possible to make an actor walk round and round himself.

"Bill, I'd like you to meet Ed Smith! We're breaking him in as a film editor!"

A Service to Producers

Traveling Matte is offered to all British film producers as a normal service by The Rank Laboratories, where a staff of specialists is available to control every step of the process. The shooting unit is led by an experienced technician, who advises the production unit on all aspects of traveling matte.

Shooting the foreground scene can be facilitated by pre-planning, when the unit art director and lighting cameraman confer with the T.M. technician. They should establish the position and size of backing; the position, height, tilt and movement of the camera; and the number and position of the lamps for both the backing and foreground lighting. It will depend on the kind of scene as to how near the unit must work to this plan; often it will be only a loose guide, but experience has shown that it is always worth preparing.

Mobile T.M. Unit

The Traveling Matte Unit brings with it all the extra equipment necessary for shooting, such as beam-splitting camera with blimp and dolly, matte film stock, lamp filters, filter holders and, in the case of Color T.M., sodium lamps. The T.M. technician is responsible for the level of the key light on the foreground scene, but the lighting cameraman of the production creates the lighting effect. While the foreground lighting is in progress, the T.M. technician advises as to camera movement and set up, and generally checks all things appertaining to the process.

Speedy Operation on the Stage

Shooting the foregrounds proceeds at much the same speed as shooting straight scenes. The backing is evenly lit by the T.M. technician according to set principles, the method varying according to size and shape, and normally he will spend only a few minutes in this operation. The day's shooting may thenceforth proceed with no loss of time from this quarter. As the cameraman has very often little or no set to light, shooting may in fact be quicker than that of normal production work. Rush prints of the scene thus photographed may be viewed the next day as in normal shooting.

As already noted, the traveling matte background plate may be shot at any time before or after the foreground. It does not require especial photographic

quality; but, because it has to combine with the foreground scene to make a picture, imperfections that would be tolerable in a straight shot may spoil a composite scene by showing up the boundary between the component images. Further, composition, perspective and movement in the plate must fit the foreground scene. The Rank Laboratories supply printed notes to assist cameramen when shooting these backgrounds.

Conclusion

Both the background and the foreground scenes of a Rank Traveling Matte Composite are a first generation dupe, and are equally in focus. The quality is thus the same, and one merges into the other. The background may be the real thing, a small model, a painting or a still photograph magnified to any desired scale, and used in conjunction with live artists and a full-scale foreground set. The artist can actually be put into a background scene. This is done by using a supplementary hand-drawn matte to bring part of the background plate to the front of the foreground action.

Economic Aspects of T.M.

Traveling matte is invaluable for trick work and special shots such as those from vehicles, but quality and price are such that a producer may often also use it with confidence, and profitably, in lieu of straight shooting.

A producer with only a small stage may embark on ambitious types of production without even going outside his studio, and much of his set construction can be replaced by a model, or a still photograph of the real thing. Exteriors can be shot in the studio without any regard to weather conditions and other hazards which are part of the normal location.

Free Rein for Producer

Many trick shots are simplified by traveling matte, and many are virtually impossible to produce by any other means. Dangerous situations can be simulated, such as an artist suspended over a busy street; scenes can be produced with an extraordinary depth of focus, or scenes with no counterpart in real life, such as in space fiction, transformations, fairy tales with giants and pixies, etc.; the car on the foreground is seen to run down the man on the background; the star artist on the background plate puts his head through the glass window on the foreground; the same man walks round himself; hundreds of extras crowd on a studio pier which is surrounded by water shot on the model tank; a man walks through the wall; the Invisible Man's bandages are unwrapped; Gulliver's Travels . . .

Traveling matte is now very widely used in this country, but its full potentialities have yet to be properly appreciated. Although it can so often be the answer to an otherwise impossible shot, it should be more generally regarded as a means to enhance production value and reduce costs, rather than just another trick process to be used when all else fails.

References

British Patent Nos. 633, 420 705, 256 708, 113 and 787, 759.

"It fell to earth I know not where."

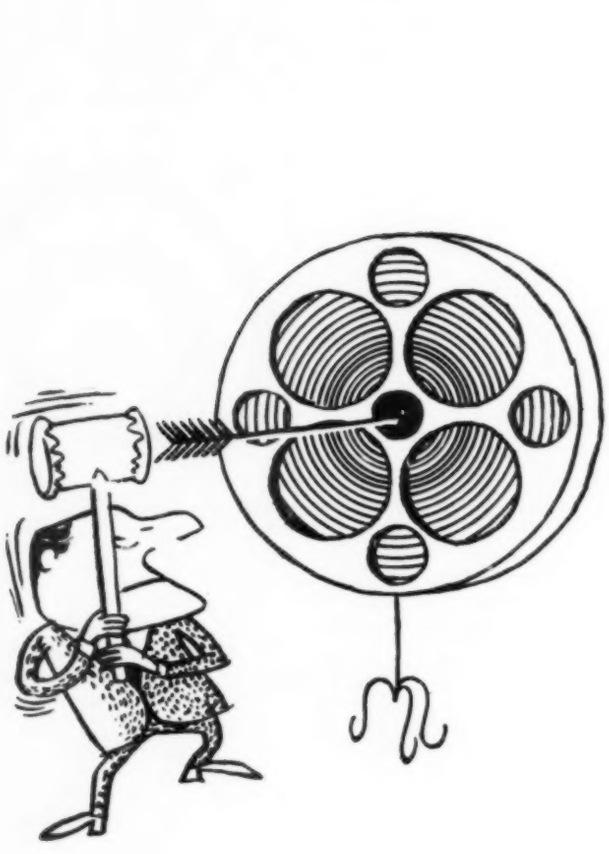
PHOTOGRAPHIC INSTRUMENTATION FOR MISSILE TESTS

Continued from Page 666

chosen for this unit to permit the camera axis to be aligned in the horizontal plane. This minimizes image distortion and permits easy evaluation of the emergence film. The camera is normally operated at 1000 frames per second, but data can be obtained up to frame rates of 2500 per second.

Engineering surveillance data are of great importance in case of catastrophic failures. In the original Jupiter concept, a high order explosion could result from the liquid propellants. This could destroy all the above-deck photographic equipment by either blast or fire and all available surveillance data would be lost. To instrument for a catastrophe, Kinescope recording of the television picture is provided. Although the resolution of this type of recording does not compare with direct photographic records, valuable data could be recovered from this back-up mechanism. Kinescope recording with timing is provided on both the fore and aft racking mounts. The picture recorded is dependent upon which camera the tracking platform operator is utilizing for view finder purposes.

The Kinescope recording system consists of a 16mm Auricon Pro-600 camera equipped with a T-TV shutter photographing a television monitor



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and is shown in Figure 5. There are no provisions aboard ship for processing positive film, and since a positive picture is desirable for projection, the picture on the recording monitor is electronically reversed, yielding a positive image on the Kinescope film.

The trajectory camera system is designed around the Maurer 220E, 70mm aerial reconnaissance camera. This camera is capable of operating in excess of five frames per second; however, it is being operated at four frames per second to assure reliable action. Because of missile dynamics associated with Polaris, a data rate of eight frames per second is required, and cameras are operated alternately to provide this effective rate of eight frames per second. The cameras used in the fore and aft units are equipped with 38mm wide-angle lenses. Fig. 6 shows a four-camera unit. The base plate, camera holders, and other castings are of Meehanite. The camera mounts are designed to allow camera interchangeability, thus permitting camera installation prior to the test and removal at the conclusion. To provide the necessary camera interchangeability, a camera standardization system has been devised. A camera holder of cast Meehanite holds the camera in a preset position with the auxiliary equipment which permits camera alignment. The camera standardization equipment and the interchangeable mounts permit camera interchange with errors in the order of no more than ten seconds of arc.

The midship instrumentation unit consists of two cameras operating alternately, and they are equipped with 80mm lenses. Optical axis alignment and film plane orientation are retained relative to each other to better than 10 seconds of arc.

Installation Described

The trajectory camera system yields missile position through triangulation; thus an extremely accurate method of system calibration and orientation is necessary for data reduction. This calibration equipment (which will be described in a later section) permits the accurate orientation of the camera platforms: first, with respect to themselves and then with respect to the ship's coordinates. A photographic record of orientation targets on the ship's superstructure permits determination of the direction of one camera's optical axis in ship's coordinates as a check on initial orientation.

The above-decks installation consists of a complex of 12 camera stations. The approximate location and type of equipment installed at each station are shown in Figure 4. The trajectory cameras, Type A installation, are located at four positions, and the Type B installation is located amidships. The three-camera engineering surveillance station Type C is shown in the position to instrument the aft launch tube. In the future a second tube forward of the present installation is contemplated. At this time, camera C will be moved to the forward position to cover this tube.

The two-camera installation Type D is used at three locations, two on the main deck and one at a higher level. The one located on the 03 level was necessary to provide initial coverage because the tracking station (to be described later) does not have a clear view of this tube. Camera Type E is located on the 03 level and permits detailed observation of missile emergence. Camera Type F is located on the 05 level and on the after portion of the ship. The entire photographic complex is operated from a single control position known as the Instrument Control Center.

Roles of Various Cameras

A brief summary of the various types of installation follows (References are to Figure 4):

The Type A four-camera station shows the four Maurer 220E aerial reconnaissance cameras. Since the maximum pulse rate for these cameras is five per second, they are operated at four per second to assure reliable operation. This data rate was insufficient for detailed coverage, and a second installation was completed with the cameras being operated alternately at an effective rate of eight frames per second. The midship trajectory station, Type B, consists of two Maurer cameras operated in a similar mode.

The engineering surveillance cameras, Types C and D, serve both as engineering surveillance and emergence cameras. They are located around the tube and provide detailed coverage from missile exit to the limit of the optics. These cameras operate at 48 frames per second with shutter exposure time in the order of 1/1000 second and provide sufficiently short exposure to yield sharp image for later analysis.

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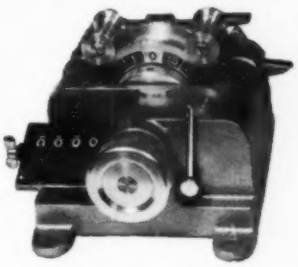

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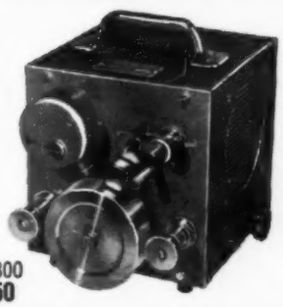

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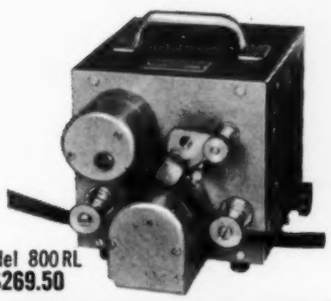

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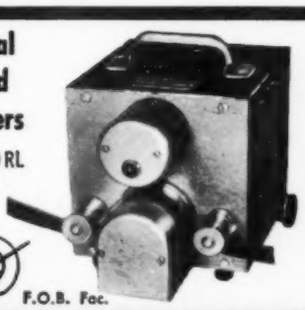

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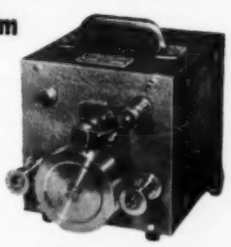

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Camera Type E is an Eastman High-Speed camera which is normally operated at 1,000 frames per second. This camera permits detailed analysis of missile behavior as it emerges from the tube until torch-off. A 13mm wide-angle lens is provided for coverage of the missile behavior, and a longer focal length lens of 63mm is supplied to permit a more detailed study of the missile as it leaves the launcher.

Camera Type F consists of two Eyemo cameras, one having a wide-angle and another having a telephoto lens and mounted on a remote control tracking platform. This is the only trainable camera type used; the rest are stationary. Tracking is achieved by utilizing a closed circuit television system as a view finder. The operator tracks the missile while observing the picture on the television picture tube.

All of the above-deck equipment is provided with protective covers. The engineering surveillance and high-speed camera housings are provided with glass ports through which the pictures are taken, thus providing protection from the elements. The trajectory camera stations are provided with similar housings, except that the distortion introduced by having a glass plate could not be tolerated. For this reason, remote controls have not been provided. Prior to operation, these doors are opened, then the pictures are taken and the doors closed at the conclusion of the test.

Because it is difficult to track a missile emerging from a tube, a predictor signal or "first motion" light is provided on the tracking console. This signal permits the operator to apply full elevation command to the tracking mount. Thus the dynamic lag of the system is overcome and smooth tracking results.

The little rectangle which appears in the center of the television screen represents the relative field of view of the Zoomar lens at maximum extension (150mm) compared to the field of view of the wide-angle, 10mm lens. When the tracking operator has the missile centered within or near this rectangle, he then changes from the wide-angle to the Zoomar television camera. The enlarged image then simplifies tracking and minimizes tracking errors.

Although both wide-angle and Zoomar lenses are provided on the television cameras, an experienced operator prefers to use the Zoomar-lens-equipped television camera with the lens set at minimum focal length, and then increase the focal length as the missile recedes from the cameras. In case he loses the missile, he can always switch to the wide-angle camera, re-center it on the screen, and switch back at will.

Remote tracking with a television view finder has proved to be easier than originally anticipated.

The Instrument Control Unit is used to program camera operations. Because the countdown schedule does not permit this programmer to initiate missile firings, the equipment was designed to be operated from events occuring in the countdown schedule. By selecting events, it is possible to initiate recording or terminate recording as required. The ICU consists of multichannel programmers which can be initiated by events preceding zero time or missile first motion. Commands following first motion are controlled by a synchronous clock arrangement. There is a possibility that the missile event may not be received properly and, in this case, all programmers are forced to the ON position by first motion signal. This, then, forces instrumentation which may not have received a signal prior to this time to the ON position and minimizes data loss. For the photographic system, the master command signal is electrical disconnect of the missile umbilical cord. This permits the various cameras to be turned on at this time, and they are turned off at a preselected time after first motion. In all cases, the camera operation time is sufficient to allow complete film utilization. The only camera equipped with automatic turn-off at the end of the film is the Eastman Highspeed camera. The other units would not be damaged if operated without film.

Data Correlation

All the photographic cameras are provided with timing to permit data correlation.

Missile position is obtained from the camera film data by triangulation calculations. The accuracy to which the final data can be obtained is directly related to the trajectory camera alignment and calibration.

To facilitate camera standardization, an optical target assembly is provided. This utilizes the fiducial marks in the cameras and references the film plane to these marks.

Two photographic laboratories were

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NOTE: The foregoing article is condensed from a technical paper of the same title presented by the author at the 4th Annual Technical Symposium of the Society of Photo Instrumentation Engineers, and subsequently published in the SPIE Newsletter.

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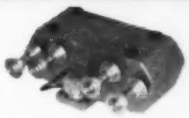

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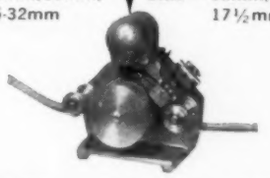
SRO — 16mm
SRB — 35mm, 16mm, 35-32mm

MAGNETIC READERS
SRM — 35mm
SRM — 16mm
SRM — 35mm, 16mm, 17½mm, ¼"



SRC { **OPTICAL** — 35mm, 16mm, 35-32mm / **MAGNETIC** — 35mm, 16mm, 17½mm, ¼"

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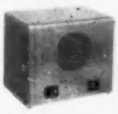

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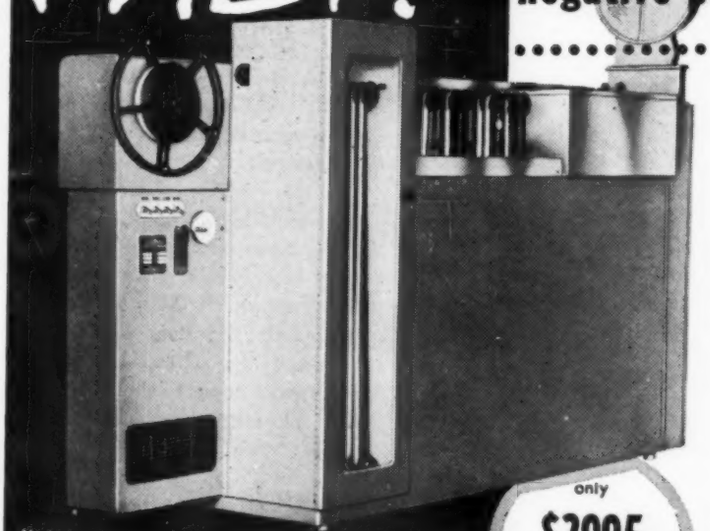

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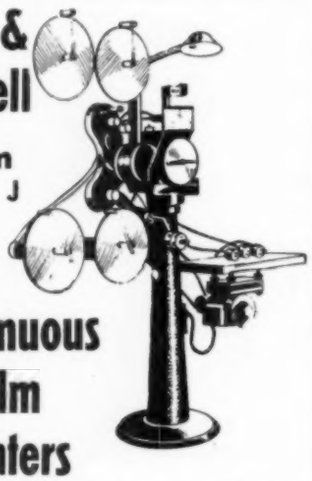

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EFFECTS WITHOUT MATTES

Continued from Page 669

to show customer and representative during the conversation. This is followed by a three-way split of the frame (see illustration) to show the IBM machine in the third segment of the picture. The IBM machine then dissolves out and in its place appears another company representative—head of the bookkeeping department—who enters the discussion and subsequently explains the purpose and function of the new IBM billing method to the customer's satisfaction.

When this sequence was first planned, conventional optical printing techniques were considered. But when the advantages in time and money savings of aerial image were considered, aerial image was chosen as the method for producing the desired optical effects.

How Split-screen Produced

The split-screen effects were produced as follows: after the animation camera was loaded with color negative, one half the field on the animation platen was blanked off with a panel of black cardboard, precisely positioned. The first live action film was then projected with the aerial image projector and simultaneously photographed by the animation camera. In this operation, the entire action of the customer telephoning was photographed in one pass of the camera.

The camera shutter was then closed and the negative wound back to the starting frame of the first exposure. The opposite half of the field was then covered by the black cardboard, and the second live-action film projected and photographed for a pre-determined number of frames (i.e., up to the point where the three-way split was to begin). This film comprised the action of the service company representative talking to the customer on the telephone about her account.

For the three-way split-frame exposure, the right half of the field was divided into two equal parts, so that the customer occupies the left half, the representative the middle segment, and the IBM (and later the head of the company's bookkeeping department) the third segment. As before, in order to photograph the action in the remaining two right-hand segments, panels of black cardboard were used to mask the desired area of the projected pictures during each pass of the animation camera, and for the specified number of frames for each.

The time required for turning out this three-way split-screen sequence included two hours for layout and preparation of the scenes, one hour to ready the camera and cardboard sections, and two and one-half hours shooting time—a total of 5½ hours. The exposed negative was sent to the laboratory around 5:00 p.m. and developed that night. Next morning the lab delivered a fine-grain color print of the sequence, which was cut into the picture to complete it. It is estimated that use of aerial image saved the producer a week to ten days of optical laboratory time and several hundred dollars in production expense.

In still another instance, use of aerial image technique enabled a producer of TV commercials to meet a rush deadline on a 60-second spot announcement for Post's cereal. Filmed in 35mm black-and-white, the job not only had to be completed in a hurry but at minimum expense. It consisted of live-action of a young lad eating a bowl of breakfast cereal and animation art depicting the boxed product and a cat that makes the product pitch via the sound track.

The art work consisted of drawings, cartoons and titles, all of which was photographed on the platen area of the animation stand. The live-action background film was projected by means of the AI projector, and the animation camera photographed the two media in a single operation. The following morning, the laboratory delivered a print of the commercial in ample time to meet the deadline.

For the project, conventional optical printing methods were also considered, but the final decision was to use the faster, more economical aerial-image-plus animation method. The ad agency provided the producer with a complete storyboard that showed how the art work was to be integrated with the live action. The live-action footage was then shot, processed and evaluated, and the selected take then projected and photographed with the art work in a single pass of the camera.

Actual Product Used

Often the actual product can be employed, instead of pictures of it, in making a combination art and live-action TV commercial. One example is a recent color film commercial for Marlboro cigarettes. Here the three-dimensional pack of cigarettes was

superimposed over a live-action background of a pastoral scene—accomplished by placing the product on the platen area of the animation stand, and photographing it as the live-action scene was projected from below.

Normally, a color sequence of this kind would be produced by using high-contrast mattes involving several strips of film, numerous passes or runs through the camera, and about a week of hard work. Using the aerial image technique, the whole film was shot within ten minutes and at a fraction of the cost of the matte method.

For the imaginative TV film producer, cameraman, or animator, use of aerial image opens many opportunities for creative as well as money-saving production ventures—a great many of which remain to be discovered and explored. Through this medium, color may be added to scenes filmed in black-and-white so that all black areas are one color, white areas another, and intermediate grey areas still another color.

Certainly, as more and more aerial image units are employed with animation equipment, new and startling developments in special effects will emerge to benefit the industry. No other previous method has made it possible to combine live-action and animation in a single take as fast and as economical. ■

PHOTOGRAPHIC ASSIGNMENTS

Continued from Page 652

ARMAND THIRARD, "Time on Her Hands" (Argus Prod.; UA release; shooting in Paris) with Ingrid Bergman and Yves Montand. Anatole Litvak, producer-director.

ERWIN HILLIER, "The Naked Edge" (Pennebaker-Baroda Prod. for UA; shooting in England) with Gary Cooper and Deborah Kerr. Michael Anderson, director.

DANIEL FAPP, ASC, "West Side Story" (Panavision 70 & Color; Mirisch Picts—Seven Arts Prods.; shooting in N.Y.) with Natalie Wood and Richard Beymer. Robert Wise and Jerome Robbins, directors.

RUSSELL METTY, ASC, "The Misfits" (Seven Arts for UA; shooting at Reno) with Clark Gable and Marilyn Monroe. John Huston, director.

EUGENE SHUFTAN, "Something Wild" (Prometheus Prod. for UA; shooting in N.Y.) with Carroll Baker and Ralph Meeker. Jack Garfein, director.

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BILL CLOTHIER, "Ring of Fire" (C'Scope & Color; Andrew & Virginia Stone Prods.; shooting in Oregon) with David Janssen and Joyce Taylor.

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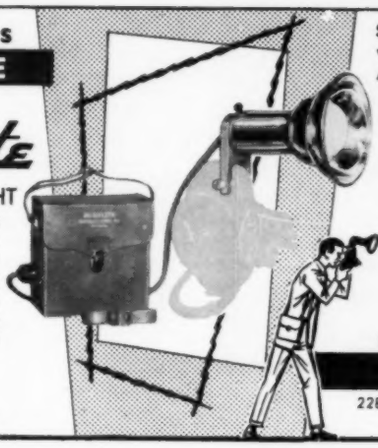

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FRANK PHILLIPS, "Have Gun Will Travel"* with Warner Anderson and Tom Tully.

FRANK PLANER, ASC, "Breakfast at Tiffany's" (Jurow-Sheperd Prod.; Technicolor; shooting in New York) with Audrey Hepburn and George Peppard. Blake Edwards, director.

RUSSELL HARLAN, ASC, "Hatari!" (Howard Hawks Prod.; Technicolor; shooting in Africa) with John Wayne and Gerard Blain. Howard Hawks, producer-director.

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GEORGE DISKANT, ASC, "Kit Carson," "June Allyson Show"* (Four-Star Prods.) with June Allyson.

HOWARD SCHWARTZ, "Robert Taylor Detectives"* (Four Star Prods.) with Robert Taylor.

CHARLES BURKE, "Dante"* (Four Star Prods.) with Howard Duff and Alan Mowbray.

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HARRY WILD, ASC, "Peter Loves Mary"* (Four Star Prods.) with Peter Lind Hayes and Mary Healy; "The Tom Ewell Show"* (Four Star Prods.) with Tom Ewell and Marilyn Erskine.

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JOSEPH LA SHELLE, ASC, "The 6th Man" with Tony Curtis and James Franciscus. Delbert Mann, director.

STANLEY CORTEZ, ASC, "Back Street" (Color; Ross Hunter-Carrollton Prod.) with Susan Hayward and John Gavin. David Miller, director.

MACK STENGLER, ASC, "Leave It to Beaver"* (Gomalco Prods.) with Barbara Billingsley and Hugh Beaumont. Norman Tokar, director.

JOHN RUSSELL, ASC, ELLIS THACKERY, ASC, EMIL HARRIS, "Shotgun Slade"* (Revue Prods.).

ELLIS THACKERY, ASC, JOHN RUSSELL, ASC, "Wells Fargo"* (Overland Prods.) with Dale Robertson.

WILLIAM SICKNER, ASC, "The Deputy"* (Revue Prods.) with Henry Fonda.

BENJ. KLINE, ASC, JOHN WARREN, ASC, EMIL HARRIS, "Wagon Train"* (Revue Prods.) with Ward Bond.

LIONEL LINDON, ASC, JOHN RUSSELL, ASC, "Checkmate"* (J&M Prods.) with Anthony George.

RAY RENNAHAN, ASC, NEAL BECKNER, "Laramie"* (Revue Prods.).

JACK MACKENZIE, ASC, EMIL HARRIS, "Riverboat"* (Revue Prods.).

RAY CORY, ASC, Bringing Up Buddy"* (Kyro Prods.) with Emil Markey and Dora Morande; "Bob Cummings Show"* (Pilot; Revue Prods.).

NEAL BECKNER, "Bachelor Father"* (Bachelor Prods.) with John Forsythe.

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ARTHUR IBBOTSON, "Royal Canadian Mounties" (20th-Fox Ltd.; C'Scope & Color; shooting in Canada) with Robert Ryan and John Dehner. Burt Kennedy, director.

FLOYD CROSBY, ASC, "The Little Shepherd of Kingdom Come" (C'Scope & Color) with Jimmie Rodgers and Luana Patten. Andrew V. McLaglen, director.

REPARTO OPERATORI, "It Happened in Athens" (API; C'Scope & Color; shooting in Greece) with Jayne Mansfield and Xenia Calogeropoubs. Andrew Marton, director.

LEO TOVER, ASC, "Misty" (C'Scope & Color) with David Ladd and Arthur O'Connell. James B. Clark, director.

JAMES WONG HOWE, ASC, "Tess of the Storm Country" (C'Scope & Color) with Diane Baker and Lee Phillips. Paul Guilfoyle, director.

CHARLES CLARKE, ASC, "Flaming Star" (Clover Prod.; C'Scope & DeLuxe color) with Elvis Presley and Dolores Del Rio. Don Siegel, director.

ELLSWORTH FREDRICKS, ASC, "Sanctuary" (C'Scope; Darryl F. Zanuck Prod.) with Lee Remick and Yves Montand. Tony Richardson, director.

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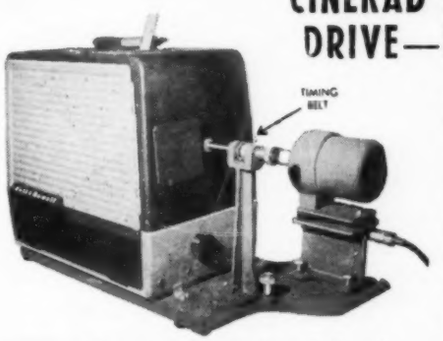

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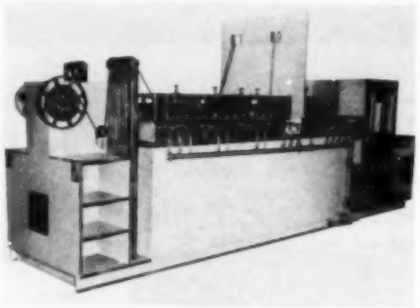
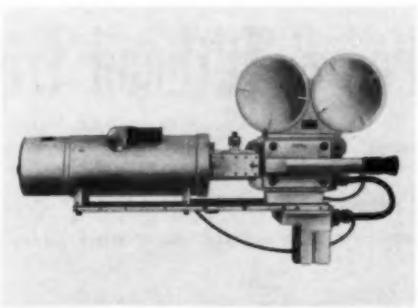


Color Film Processor

A new combination 8mm/16mm and 35mm color film processor is announced by Houston Fearless Corp., 11805 West Olympic Blvd., Los Angeles 64, Calif. The compact Duplex Model 312 automatically processes 8mm/16mm at 720 feet per hour, and 35mm Kodachrome or other compatible color film at 240 feet per hour.

Two separate drive systems on opposite sides of the machine—one for 8mm/16mm, the other for 35mm—utilize a common set of solution, rinse and wash tanks plus dry box. Film tension is eliminated and automatic shutoff switch is provided. List price is $21,500.

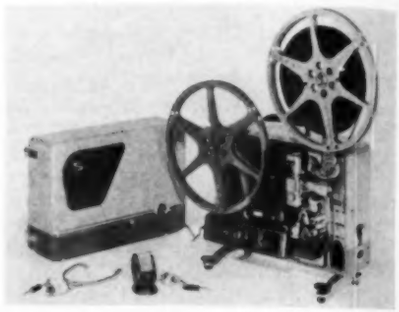


35mm Boresight Camera

Camera Equipment Co., Inc., 315 West 43rd St., New York 36, N.Y., announces its appointment as distributor of the Cameraflex 35mm boresight camera, designed to photograph targets tracked by radar.

Features include register-pin movement, through-the-lens viewing via reflex shutter, variable shutter, 24 fps sync motor, built-in data recorder, 40″ or 80″ Catadioptric lens, film magazines (either 200′ or 400′) driven by separate torque motor, and a radar-secondary mount with provisions for azimuth, elevation and camera focusing adjustments.

The shutter mechanism is driven through a differential drive which controls a return pulse contractor, giving a return pulse at precisely mid-point, regardless of the degree of shutter opening.



Bolex Mag/Optical Sound Projector

A 16mm magnetic-optical sound projector is announced by Paillard, Inc., New York, N.Y., importers and distributors of Bolex equipment. Machine will project films with optical track at 24 fps or silent films at any speed from 16 to 24 fps.

Equipment is ideally suited to needs of in-plant and industrial film makers for recording magnetic sound on 16mm films—originals or prints—after films have first been sound-striped for the purpose. Provision is made to protect against accidental erasure of recorded sound. Speaker is built into the projector cover, has a 6-watt power output, and is 8 inches in diameter.

A 750-watt or 1000-watt lamp is optional and is mounted on hinged lamphouse door for convenient changing. Lamp brightness may be controlled and measured by built-in meter. Adjustable shutter makes it possible to eliminate flicker while machine is in operation. Motor speed is variable from 18 to 24 fps and is accurately stabilized electronically.

Price Changes on E-K Films

Prices of three E-K 16mm B&W reversal films will go up approximately 10% November 29th. These films are: Eastman Reversal Duplicating Film, Type 7504; Tri-X Reversal film; and Plus-X Reversal Film, Type 7276.

FILMING "THE ALAMO"

Continued from Page 663

kets and everything else available in order to keep warm, the company continued shooting all night to get an important sequence on film.

Fog was both a blessing and a curse. There is an effective sequence in the picture in which Davy Crockett (John Wayne) and his raggle-taggle brigade move stealthily along, waist-deep in a creek, on their way to raid the enemy camp. The fog lifting off the water lends a ghostly touch of mood to the sequence, a seeming triumph of the Special Effects department. However, the fog, in this instance, was courtesy of Nature and the problem was that there was too much of it. Clothier had to call for wind machines to dispel enough of the vapor so that the actors could be seen.

Filming "The Alamo" involved a great deal of night shooting—thirty nights, to be exact. The company shot for two weeks on the "night shift" and then shot in the daytime for five more weeks before returning to the night schedule. All of the night scenes in the picture were actually filmed at night. There are no day-for-night scenes shot with a combination of blue filter and under-exposure, as is common with many outdoor color film productions.

Shooting night sequences was facilitated by the fact that a limited supply of the "new" Eastman Color Negative became available just at the time these scenes were scheduled to be filmed. This meant that Clothier could now work in light levels of only 150 foot-candles as compared to the 300 to 350 foot-candles that had been required with the slower color negative. Nevertheless, a great deal of light was required to illuminate the vast sweep of western streets and the Alamo itself.

An army of electricians manned the forest of 10KW "Brute" arc lights

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brought from Hollywood. Two 1500-amp generators had been brought along, and a special, giant 4500-amp generator had been built to order, at enormous cost, especially for the picture. Altogether 7500-amps of current was available—enough to light a good-size town.

While there are many moving camera shots in the picture, the movement of camera is so well integrated with the action of the subject that such shots never become obtrusive. Moreover, the scope of the Todd-AO picture format is so vast that it seems to absorb much of the apparent camera movement.

Effective Dolly Shot

An especially effective dolly shot is used early in the film to show General Sam Houston riding into town with his entourage. The camera brings him around a corner, dollies about a hundred feet down the street with him and makes a 180° pan to take him through a door. There are about 25 horsemen in the scene and numerous people on the street, and because the principal figure is kept centered throughout the shot, the complicated camera maneuver itself is scarcely noticeable. Nevertheless, it is extremely effective in capturing the full sweep of the action.

A happy accident during filming resulted in what is probably the most striking shot in the entire picture. There is a sequence in which Mexican cannoneers are seen roaring down a hill with horses at full gallop and caissons in tow. They make a sharp turn to come spalshing through a creek in the foreground. One of the Todd-AO cameras, remotely controlled, had been set up on a tripod in the middle of the creek about eight inches above the water. There were ten cannons, and they were supposed to "split the camera," alternating on either side. The action started and all went well until one caisson broke loose just as a team swung around the curve, throwing the horses out of control. The team split and the cannon hit the camera. Camera, horses and men were all thrown into the creek. After the cannon and horses were rescued, technicians ran into the creek to salvage the camera. They found that, although completely submerged, it was still running! In fact, the man who first touched it got a shock before the gaffer had a chance to cut off the current. When the film in the camera was unloaded it was found that not a drop of water had penetrated the magaizne. The film was in perfect condition and the resultant shot on the screen has a subjective impact that all but knocks the audience over the backs of their seats.

The Siege of the Alamo is, of course, the climactic sequence of the picture and might be regarded as a sort of field day for the camera—or, in this case, the five Todd-AO cameras strategically placed to record the action. As Clothier laconically observes: "Five Todd-AO cameras can just about take in everything." And that they did.

Riding herd on five camera crews was a frenzied activity in itself, and, although equipped with elaborate radio communications as well as handy walkie-talkie units, Clothier preferred to make personal contact with each camera crew prior to shooting each scene. Sometimes, because of changing conditions and complicated placement of explosives, he had to make two or three round trips to make sure everything was alright. The resultant melee, as captured on the large screen, is just about the ultimate delineation of motion picture warfare.

The battle sequence is a masterful achievement of Special Effects and stunt riding. Special powder magazines were built a safe distance from heavy traffic to house the 25,000 pounds of black nitrate powder used in the siege sequence—more than three times the amount consumed in the actual battle. A crew of 15 skilled gunsmiths kept the company's arsenal of archaic rifles, pistols and cannon in working order.

Spectacular Shot

The more spectacular phases of the mass battle action were carried out by eighteen specially selected stunt actors, an elite body of skilled men for whom risking life in movie scenes is all in the day's work. These veterans performed with reckless daring. The cameras caught what is considered the most amazing horse fall in screen history. This climactic action occurred when a troop of Mexican cavalry cleared the lowest barricade of the Alamo with a precisely-timed jump, then all went down as one man under a point-blank cannon blast. So realistic is the effect on the screen that it is almost impossible to believe that not

Continued on Page 702

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FILMING "THE ALAMO"

Continued From Page 700

a man or horse was injured in the action.

The selection of the Todd-AO wide-screen process was made mostly as the result of the hard fight put up by Cinematographer Clothier to use the format. Although Todd-AO has previously been used mainly to film musicals, Clothier felt that a picture with the vast scope of "The Alamo" needed the biggest medium available. He was impressed with the crisp resolution inherent in the Todd-AO lenses and the almost magical three-dimensional effect which the process seems to impart to cinematography. He managed to convey his enthusiasm to John Wayne and the decision was made.

In speaking of weather difficulties on the picture, Clothier voices attitudes common to all directors of photography involved in today's very special production economy.

"Making pictures today isn't at all the way it was thirty years ago," he observes. "In those days if you waited all day for weather it cost only a few dollars as compared with the thousands of dollars it costs a film company today. These days you've got to keep working no matter what, because it's part of the cameraman's responsibility to keep the producer in business. If we don't, we're kicking ourselves and many other people out of jobs. So we have to keep shooting, not just under ideal conditions, but also under conditions which prior to the war would have been considered impossible. In any picture these days you will see scenes that don't match, because you simply can't match them without costly delays. You may start a sequence on a sunny morning and a couple of hours later the clouds cover completely. It's overcast and the light is of a completely different quality—but you have to keep right on shooting.

"When we made 'Wings' in San Antonio in 1926, we wanted to shoot the bombing of a village, and sat around for three weeks waiting for clouds. We played baseball every day while waiting for cloudy weather, and that's all there was to it. Finally we got clouds and shot the sequence. You can't do this anymore. It would break the producer if you took a company like 'The Alamo' and waited three weeks for anything. All cameramen are cognizant of this and it is unfortunate sometimes that you have to go ahead and work under these conditions—but today it is absolutely necessary." ■

HIGH-SPEED PHOTOGRAPHY

Continued from Page 658

ucts are studied for noise reduction, vibration analysis and control, combustion, ignition, and structure. In each of these studies, high-speed photography plays an important part. One significant problem involving both noise and vibration in outboard motors was revealed by high-speed cameras to be caused by undue flexing of the crankshaft and crankcase of the motors. High-speed photography also has assisted in analyzing the frequency, modes and amplitude of the troublesome motion under study.

In another instance, the high-speed camera was used effectively to analyze the damaging action which takes place when an outboard motor under way strikes an object in the water. The studies contributed to the development of hydraulic shock absorbers on high-powered outboard motors.

The design and efficiency of power-driven lawn mowers and chain saws have also benefited by high-speed photographic studies made by Outboard Marine Corporation engineers. These and other applications of the Fastax high-speed motion picture camera were screened as a part of the paper presentation.

The papers described above reveal the substantial gains being made by high-speed photographic techniques in industry. More and more industries are employing high-speed cameras as vital tools in engineering, and in explorations aimed at improving products or extending their usefulness. As a result, in-plant photographic units are increasingly being called upon to supervise if not actually provide high-speed photographic service for their company's researchers and engineering departments. ■

SELECTING LIGHTING EQUIPMENT

Continued from Page 677

plus scrims or diffusers, gobos, blades or cutters, and "cookies"—the familiar name for abstract filigree designs cut from opaque or translucent material and used for the purpose of breaking up hot-spots, blank walls, etc., as well as for creating interesting shadow patterns.

Many scenes included in the average commercial or industrial film fall within the category of *location filming*, a term which refers to shooting that takes place away from the studio or main base of operations. The major demand which location shooting makes upon the production crew is facility in moving around, setting up and tearing down. Thus, portability of equipment becomes very important. The in-plant film unit is constantly faced with this problem since shooting is often done in far-flung areas of the plant, a considerable distance from the customary main shooting area or place where equipment is stored.

Another location problem is locating a power source for the lighting equipment. One alternative, if you are working in an industrial plant, is to tie a cable with junction boxes directly into the existing heavy power source used to run the machinery. This is sometimes time-consuming, requires going through a chain of command to obtain permission, and usually demands the services of a master electrician to make the actual tie-in. Moreover, such sources used for operating heavy equipment are subject to considerable variations in voltage, a circumstance that can wreak havoc with your lighting insofar as exposure and color temperature are concerned.

The second alternative is to trundle a generator along wherever you go. This means a substantial investment if a generator large enough for efficiency is purchased. If the equipment is rented, the charge can amount to a sizable sum if any great amount of location filming is done.

The most practical alternative is to purchase lightweight, portable lighting equipment and a step-up transformer that supplies voltage for a number of lights from a single 110-volt domestic power source. *(Contd. on Next Page)*

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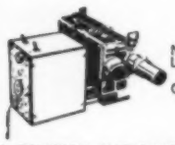

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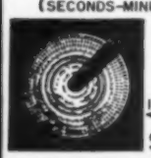

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Recommended equipment of this type are ColorTrans, manufactured by Natural Lighting Corp., Burbank, Calif., and Garnelites, distributed by J. G. McAlister, Inc., Hollywood. Both types of equipment are available in a variety of lamp sizes and styles, with converters of different voltage output to suit the producer's needs. Both ColorTrans and Garnelites are regularly used by Hollywood studios and industrial film producers. For the business film or in-plant film production unit they offer the following advantages:

1. They produce more illumination from less current than any other method of motion picture lighting. For example, they put out the equivalent of 5000 watts of light (equal to ten No. 2 photofloods) using only 28 amps, as compared with the approximately 50 amps that would be needed with conventional equipment.

2. The amount of investment is a fraction of the cost of conventional units producing a comparable volume of light. For example, a 2000-watt Junior Spotlight would cost upwards of $150.00. ColorTran and Garnelite units capable of producing the same amount of light average about $40.00.

3. Both systems have regulators that control the color balance of the light regardless of input voltage variation.

The basic lamp head unit of both systems (ColorTran Cine King or Garnelite GL-1) is a sturdy aluminum housing 9 inches in diameter designed to be used with PAR 64 (500-watt) and PAR 56 (300-watt) sealed-beam lamp units. When operated with a converter, a PAR 64 lamp will equal the performance of a conventional 5000-watt studio keylight—that is, it will put out 325 foot-candles of illumination at a distance of twenty feet.

Although the PAR lamp units cannot be focused like conventional spotlights, they are available in a choice of three light beams—narrow spot, medium flood and wide flood—which make them adaptable to a wide range of photographic requirements.

Besides its basic Cine King lamp head, ColorTran produces two other lamp heads which serve as valuable lighting adjuncts:

The Kicker light (7″ in diameter) is a compact unit designed for use with a 300-watt or 500-watt spot or flood, or 150-watt or 200-watt household lamp. Using an R-40 reflector type lamp with the output increased by the converter, it puts out illumination equal to that of an 1800-watt unit. It is an excellent small lighting unit for illuminating dark corners or hard-to-light restricted space. It also functions as an ideal closeup light, clamp-light or unit attached to the camera.

The Super Kicker light is similar in design but bigger (9″ in diameter) and provides more illumination. Covering more area than any other single source light of its size, it is designed for use with a variety of lamps. When used with the R-60 tempered glass built-in reflector type 1000-watt lamp and a ColorTran converter, it puts out the equivalent of 3700 watts. It is lightweight, compact, and can easily be hung on a clamp.

ColorTran manufactures a myriad of other lighting units, each of which has its own special application. There are also complete kits containing lamps and converters that fold up compactly into fiber cases for easy portability.

ColorTran manufactures four different converters of various types and capacities, ranging from the very low-cost Junior Converter that can light eleven 150-watt lamps or equivalent, on up through the deluxe Cinemaster Chief Converter—which has individual lamp control and will power five 500-watt lamps at 115 volts or eleven at 230 volts.

Garnelite converters are available in two models. The GC-1 or "Workhorse" model is a 110V-220V A.C. converter which controls all lights individually by means of four separate switches, each with seven voltage positions. It is completely fused for full protection and is noise-free for sound recording.

The GC-2 or "Executive" model has the same capacity as the GC-1 (4 PAR-64 or 6 PAR-56 lamps), but each lamp, besides being individually controlled, is also separately metered to give accurate color temperature readings for color photography.

For film production units whose scope of operations does not justify either the expense or the storage problems that bulky studio lighting equipment would entail, the portable lights and power converter are a practical choice. Moreover, such equipment may be integrated with heavier lighting equipment, should the occasion demand it. On the other hand, when used alone, the "portables" furnish illumination of quality and volume to satisfy almost any professional requirement. ■

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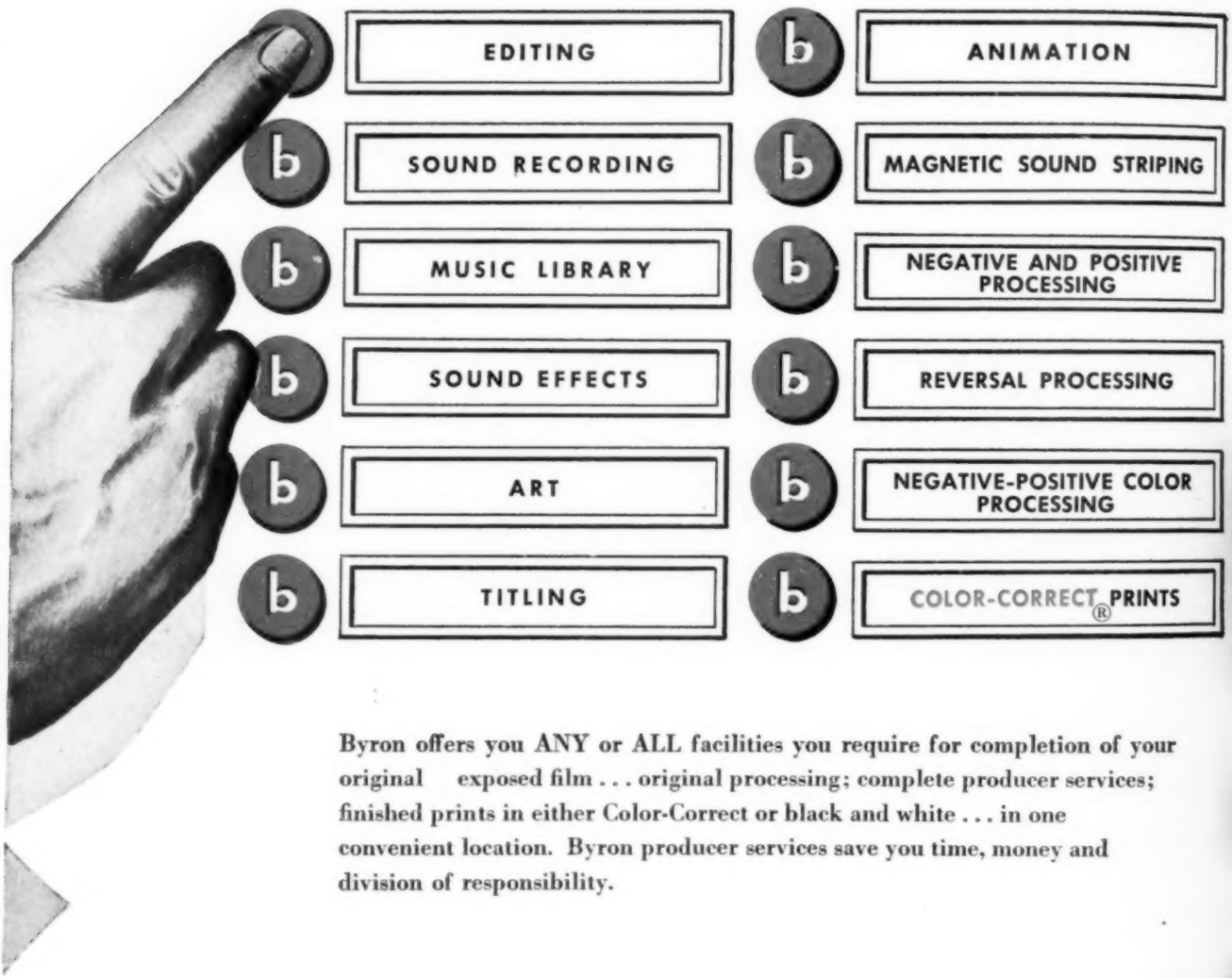

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